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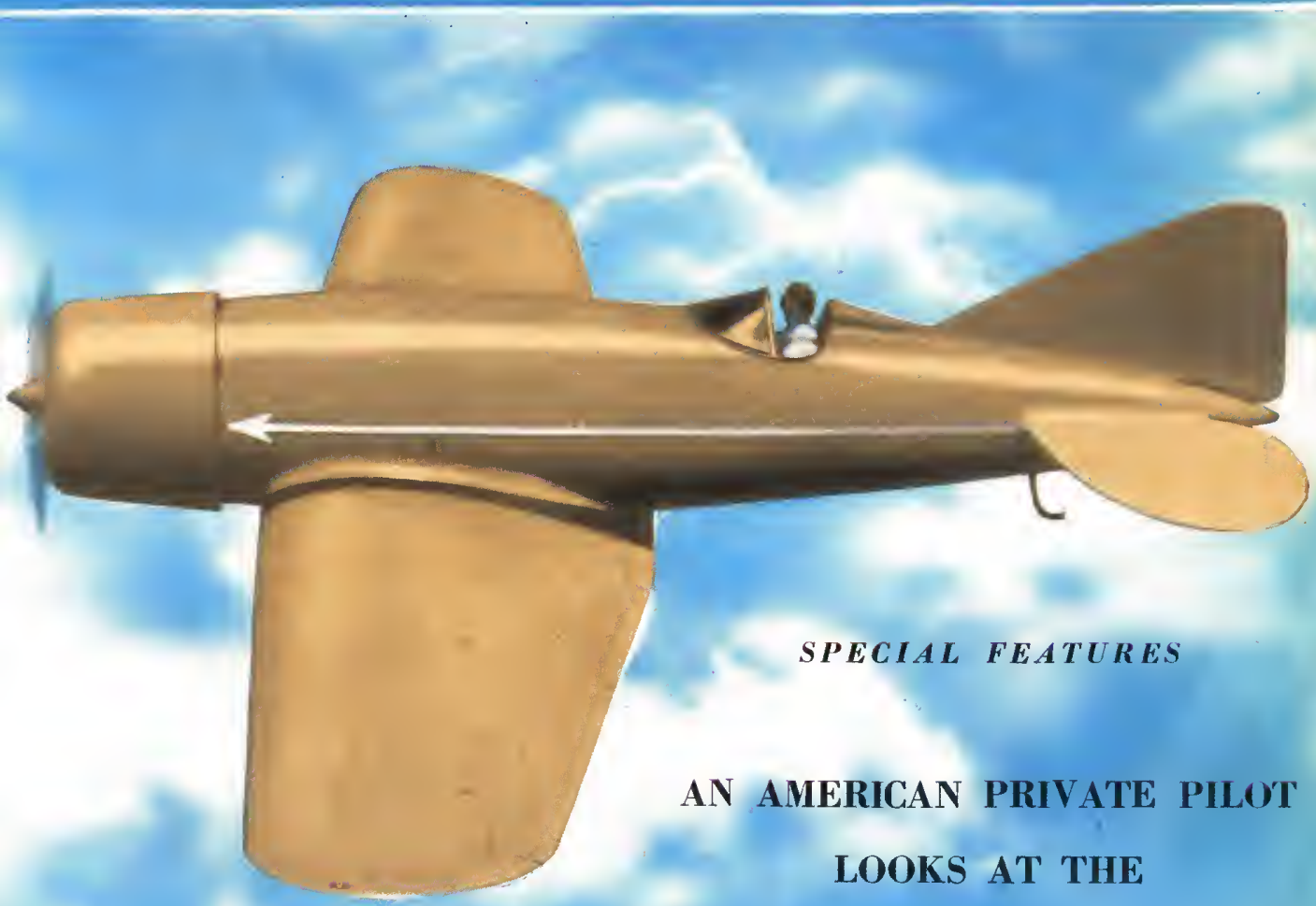
The Oldest American Aeronautical Magazine



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***700* TO *1,000 Flying Hours* BETWEEN OVERHAULS**

SOME PERTINENT FACTS ABOUT *Aviation Engine Oils*

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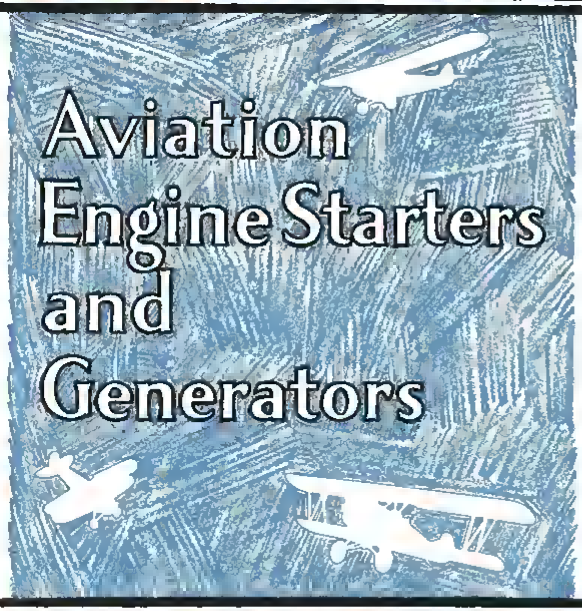

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AVIATION August 10 1929 Vol. 27 No. 6 Published weekly by McGraw-Hill Publishing Company Inc. New York, N. Y. Domestic $4.00 a year Canada $5.00 All other countries $6.00 20 cents a copy Entered as second class matter July 1 1929 at the Post Office at New York N. Y. under the Act of March 3 1879 Printed in U. S. A.

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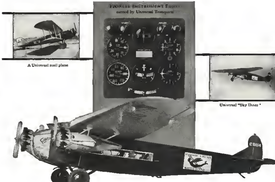

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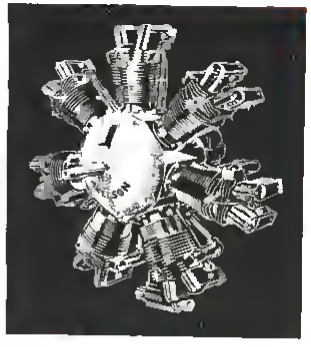

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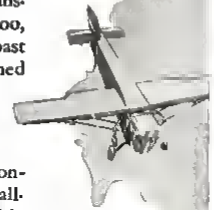

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August 10, 1929
VOLUME 27 NUMBER 6

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 27 . . . *August 10, 1929* . . . NUMBER 7

The Robin and Its Crew

IN CONFRONTING the wonderful record set up last week in St Louis, we find ourselves under the embarrassment of having exhausted most of the available terms of praise upon the new record-breaker's predecessors Little more is possible than to re-echo with redoubled force all that we have said before, when previous successful attacks have been made upon the same mark, about the machine, the motor, and the men

A figure which exceeds any previous attempts by almost seventy-five per cent, however, and the amazing feat of remaining for a full two and a half weeks in continuous flight, call for something more than that Especially is that the case when the conditions under which the trial is run approach so nearly to the ideal.

We have taken occasion from time to time to call attention to the desirability of the conduct, or at least the close supervision, of such tests as these by the manufacturers of the equipment We have observed with gratification that this latest extraordinary performance was under the direct control of the builders of the airplane, closely allied with the company responsible for the engine. That is as it should be The success which has been obtained in this entry of the industry into the field of record-breaking ought to encourage the adoption of a similar course in future attempts on this and other established marks

Particularly noteworthy was the use of an engine of a comparatively new type, one which first came on the market barely a year ago Experience, and evolution through trial, still have a value that nothing else can quite supply, but a competent design staff, with a proper respect for "theoretical" methods and with a sufficiently broad and varied experience of their own, can come close to the bull's eye at the first trial A few months of development can then produce reliability like that of the power plant that carried O'Brine and Jackson.

Whether or not this will put a temporary stop to the enthusiasm for refueling records we do not dare to prophesy The staggering level now reached by the duration figure should at least make any candidate hesitate and reflect and consider his plans very carefully indeed before deciding to go ahead

The present offers an excellent occasion, also for a sober survey of the usefulness of refueling flights There are those, here and abroad who are proclaiming them a futile waste of effort There are others who see in them the dawning of a whole new type of operation, with enchanting possibilities of passenger and mail transport over runs of thousands of miles without stopping, the plane taking on fresh supplies in flight We cannot align ourselves with either party We find these tests of enormous interest If properly run, they are of enormous potential value as a test of the equipment and as a spectacular display of the extraordinary reliability and durability that it has attained They need no practical commercial employment to justify them.

THEIR PRACTICAL EMPLOYMENT IS, to be sure, likely to be very limited There may be certain routes upon which refueling might pay its way showing a gain worth the complication of the refueling arrangement. In military operation however it meets an unquestionable need To be able to transfer flying boats for great distances over land with refueling en route, or to fly big landplane bombers to the Hawaiian Islands with supplies picked up from smaller planes based on aircraft carriers along the road, would be of great and obvious value The Army and Navy would be remiss if they did not include those possibilities in their plans for the operation and transfer of equipment in war On the commercial side, we are quite content to let the flights of the last six months stand on their own feet They have had a more beneficial effect than many undertakings more spectacular The pilots of the Question Mark saw their record quickly surpassed, and it has now been almost tripled, but theirs is the credit for

arousing interest in an undertaking which has taught the general public things about the capacities of airplanes and their engines previously undreamed of by the layman.

//

Alcohol and Altitude

THIS IS a delicate subject. We approach it with some trepidation. In the course of the past twenty years it has become a political issue and a moral one, but we are not concerned with it in either of those aspects. Upon its political bearings we have no editorial views to express. We are concerned only with the safe operation of aircraft and with the general public's confidence in flying.

The non-flying public has unhappily been learning about airplane pilots from "War Birds" and the thrilling chronicles of drinking, flying, and fighting which have succeeded it—graphic portrayals of the psychology of men living under wholly abnormal conditions, and submitted to almost unbearable strain, but having no more to do with flying in 1929 than privateering in the war of 1812 has to do with the running of the *Leviathan* today. The aircraft industry ought, for the sake of public confidence, to take an interest in making the distinction clear.

It is a fact that there exists in some quarters an impression which we are sure is wholly inaccurate, that very many airplane pilots are recklessly heavy drinkers. It is a fact that any such impression is exceedingly discouraging to prospective passengers. Whatever their personal views on prohibition, they have no desire to go flying behind a hang-over.

That there may be no misunderstanding, we want to repeat that we emphatically do not suggest that there is serious danger of their having to do so. The operators of air transport lines here and abroad are treating this question precisely as are the operators of railroads and of other transportation enterprises. They are treating it simply as a factor in operating efficiency and safety, and a very important one.

IT IS and has been for much more than ten years a common rule in railroad practice that no operating employee may take a drink at any time, on or off duty, or frequent a place where liquor is being supplied. It is a universal rule of the railroads, as well as of responsible marine and highway transport companies, that there must be no drinking on duty or shortly before coming on. It is obvious that the operators of an air transport line cannot afford to take any longer chances with lowered physical efficiency of their pilots than can motor bus operators with their drivers, and the regular air transport companies have in many cases adopted and will ultimately universally adopt rules at least as stringent as those covering surface transportation. Even in European countries where the use of alcohol in very light forms is a universal habit, transport companies forbid any drinking in the morning before starting for a flight. Department of Commerce licenses are subject to immediate revocation for flying under the influence of liquor, and Department of Commerce inspectors are forbidden to drink at any time. Most pilots, however, either here or in Europe, need no rules. Their own interest in their work and their own desire to maintain their efficiency at the highest pitch will keep them sober.

There have been, from time to time, pilots who seemed to set all rules at naught, and who boasted that they could fly as well drunk as sober. Some have gained a temporary fame. Some have found retirement from aerial activities the better part of valor. Very few remain. None of them are going to be in important or responsible positions in commercial aviation. They and their ideas are repudiated by the aircraft industry. Theirs would be the worst possible example for young men entering upon the aeronautical profession to follow.

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Who Commands an Airplane?

MOST OF OUR READERS, and especially those who are pilots, will be surprised that such a question can be raised. They take the answer for granted. The airplane, they will say, is in charge of the man handling the controls. There can be only one pilot. He brooks no interference. He engages, except in rare cases, in no consultations. He alone reaches the decision on what is to be done, and he translates it directly into action.

Although undoubtedly the general view, that is not absolutely a universal one. There are leading operators and constructors who hold slightly different opinions, especially in Central Europe, where there is a school of thought which would divorce the responsibilities of command and of decision from the technique of piloting. The actual maneuvering of the plane would be left in one set of hands. The responsibility for the planning of the general course of action to be taken would be placed in another.

This plan for a division of responsibility shows itself in the design of the giant Dornier plane just tested in Switzerland, for the DOX has controls for two pilots side by side, and behind and above them a bridge or a little office for the commanding officer, a place from which he can look down upon the pilots and give them his orders. Officials of the KLM, the Dutch Air Transport Company, have prophesied a similar division, and plan to transfer their best pilots, as they pass beyond the ordinary flying age, to posts of command where the demands upon their quickness of hand and keenness of eye will be reduced, while still leaving an opportunity for the use of their large experience. There is a certain precedent for placing the direction of the flight elsewhere than in the pilot's hands in the practice frequently followed in military and naval services of making the observer the senior officer in the plane and setting the pilot under his direction. There was a precedent, also, in the planning of the Navy transatlantic flight of ten years ago, where the Commanding Officers of the NC boats were not listed as the pilots.

ONE OF THE ARGUMENTS in favor of the division is grounded on marine practice, where the captain of the ship seldom if ever touches the wheel. That is the task of a member of the crew who is never supposed to exercise judgment, but only to give ten degrees right rudder or fifteen left or hold her steady on a designated course at the word of command.

So respectable a body of opinion certainly deserves respectful study and consideration. Having given it all due weight, we nevertheless find ourselves unable to agree with it. Analogies are dangerous, and the handling of a ship at sea is a very different thing from the operation of an airplane. Emergencies arise in both, but they develop with startling rapidity in the air, with comparative slowness upon the surface. At sea the major problems are those of navigation, and the actual steering of the course as directed is a comparatively simple matter. In the air, it is the handling of the controls that is dominant, and quickness of action is indispensable. The problem of the veteran pilot who does not transfer to an executive position will be met by technical progress, making the manual operations of piloting simpler, with a gradual raising of the age limit as the result. To foresee the pilot become a mere quartermaster his hand the obedient instrument of the brain of a superior officer pacing the bridge of a giant airplane exceeds the present bounds of our imagination.

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The British Show Their Wares

GREAT BRITAIN has recently marshalled an impressive array of its excellent aeronautical wares, and for twelve days has been heralding them to the world at large. It is called the Seventh International Aero Exhibition, but primarily it is a presentation of the present status of the British aircraft industry.

The nine years which have elapsed since the Sixth International Aero Exhibition was staged in London have given opportunity for far-reaching evolution in aviation. The contrasts between the 1920 and 1929 displays emphasize again the tremendous progress which has been achieved. This progress in Great Britain is indicative, also, of the general advance throughout the world for the English industry stands well up with the leaders of world aeronautical progress.

In a comparison of the Sixth and Seventh Exhibitions several points are conspicuous. Among them is the predominance of metal construction of the present day, as opposed to the wood and fabric construction of a few years ago. The influence of the World War in aircraft design, so prominent nine years ago, has been wiped out of the contemporary products although it is noteworthy that the display includes a considerable majority of machines designed purely for military purposes.

Among the commercial exhibits is the first American-built tri-engine transport to be displayed in Great Britain. This American invasion of Europe deserves the closest observation by the whole American industry, for, like other planes from this side of the Atlantic that have been seen in England previously, the American representative at Olympia has drawn forth very favorable comment.

NO CROSS-SECTION of present-day aviation in England would have been at all true to life without a conspicuous proportion of the light plane. Nowhere else in the world has the really light plane been so successfully manufactured, or its use been so extended, as in England. Therefore, it was to be expected that in this show the light plane would occupy a prominent part. In fact, the numerous light planes shown constituted the distinctly British aspect of the commercial part of the exhibition, as distinguished from the general run of heavier types displayed in air shows the world over.

Looking at the English display of its flying equipment from this side of the Atlantic, we see it as indicating two things. First that the British designers and manufacturers still have to give too much of their time and talent to the strictly military types at the expense of the ultimately more important development of commercial aeronautics, second, that in at least one division of commercial aircraft design, that of the light plane for the private owner-pilot, they have not only avoided the reproach of neglect but have given the rest of the world a very definite lead.

A detailed description of the exposition as seen through the eyes of a former editor of AVIATION is presented elsewhere in this issue. The observations are the reflections of a personal visit to Olympia and they are rendered all the more valuable to the American reader because of the close contacts to the British Aircraft industry which he enjoyed.

AN AMERICAN PRIVATE PILOT LOOKS AT THE London Aero Show

We are giving a large amount of space to the Olympia Show. We expect to supplement this article by at least one more. The American industry cannot neglect what is being done in Europe. Engineers who were unable to cross the Atlantic for the show should make the most of Mr. Osborn's observations.

By Earl D. Osborn

OLYMPIA, home of all of London's great exhibitions and in particular of the recent aero show, is a fine hall reasonably near the center of the city. The airplanes, engines and accessories which it housed from July 16 to 23 were not only extremely interesting in themselves but most attractively displayed. The show was partly commercial and partly military, but on the whole the balance of interest and numbers lay on the military side. To an American visitor two things were of particular interest. The first was the British use of metal, both light alloys and steel, in specially and often elaborately shaped structural parts; the other, the British development of large-capacity ocean-going flying boats.

As there were over two hundred exhibitors at the show, it would obviously be impossible to give a complete and detailed account of everything that could be seen. It is better and clearer to give the more important features and by grouping types of planes to give a general impression of the state of British aircraft development. One important fact to be noted was that there were only twenty British aircraft manufacturers exhibiting, and in this number are included two or three firms doing only experimental work. About fifty planes of British manufacture were on exhibit, with several hulls and fuselages without wings. There were also fourteen foreign planes exhibited. [The total number on display was thus somewhat lower than at the recent Chicago and Detroit shows.—Ed.] Twenty-six engine manufacturers, including foreign licensees, displayed their products. The balance of the exhibits was made up of accessories and the displays of schools, societies, and government departments.

A view across the engine section. (Note the use of models in the decorative scheme)

There were several respects in which the show was more attractive than any held so far in America. Olympia covers a block, and is divided into two main halls. The roof, or rather the skylights, are three high stories above the ground, and a good-sized gallery used for the display of accessories, runs around the sides. There is a sense of spaciousness which is sadly lacking in the halls at Chicago, New York, and Detroit. The halls were draped with banners and decorations, but most important of all was that the planes were not jammed in together as they have been at our own shows. The aisles were amply wide, and there had been no attempt to crowd planes in as if they were being stored in a hangar. This policy meant leaving out the large passenger airliners which are so important a part of British civilian air development, but at this time of year all the available airliners are in use anyway. There were a large number of planes, especially military types, with parts of the wings or fuselage uncovered so that they could be inspected by the public. There were also a good number of cut out engines being turned over so as to show the working of the parts.

THE ENTIRE GALLERY of one of the two halls was reserved for the displays of the British Air Ministry and the Royal Aeronautical Society. The display of the Air Ministry was obviously planned to impress the public, and especially foreign visitors, with the thoroughness and strictness of inspection of British aircraft. All the various phases of the testing of materials and the inspecting of workmanship were shown, and one left with the feeling that Britain was carrying out this end of its work with a thoroughness which might be galling to the manufacturers but which ought to assure a reliable product. The Royal Aeronautical Society had arranged a most artistic display of historic models, suspended in chronological order against a background of rolling English landscape and producing a most pleasing effect. There were also many old prints and photographs of events of historic importance. It was plain that more artistic effort had been put into the show than is usually the case. The general impression was one of color, airiness, and good taste.

The accessories housed around the galleries were well displayed, and most of the booths were partitioned off so as to have small private offices in the rear. There were also an adequate number of chairs for tired visitors to sit in. Three planes, the Fairey monoplane which flew to India, a supermarine racer, and a coupe Moth all painted in white, were suspended from the ceiling or mounted on high pedestals. Such features as these gave the show an air which made it pleasant to be in the hall.

As has been stated before, the use of metal was one of the most interesting features of the show to a visitor from the United States. British manufacturers, or rather the British Air Ministry, were slow in approving the use of metal in aircraft, and except in the smaller commercial machines there is even to-day practically no welding in evidence. Probably because of this, the British are far ahead of us in the use of light alloys and stainless steels. In America, welding became standard practice many years ago, and we have never learned anything better. The British have developed most ingenious methods of fastening tubular structures such as fuselages together, and have built wing spars which, though they look extremely complicated at first glance are in reality not so very hard to make. To go into the detail of these structures would require too much space here. [This type of construction has been described in detail by Capt. Sayers in Aviation's Aeronautical Engineering Supplement for June 15 and July 20.—Ed.] For fastening the fuselage tubes a number of schemes have been worked out. Some use gusset plates inserted in split tubes, others use collars fitted around tube ends, but in all cases the result is a fuselage which is finally assembled by riveting. One of the neatest exhibits of this was found in the Bristol Bulldog. In the wing spars there is a great variety of types. The simplest is a two-piece section, put out by Boulton and Paul for light planes. The two sections, after having had the proper corrugations rolled into them, are clamped together by a crimping and drawing process. The more complicated spars for large planes, such as those put out by Short Brothers, consist of both stamped and drawn sections. The center of the short spar is a square box with stamped lightening holes. That is surrounded

by four corrugated sections which have been drawn into shape, and the whole is riveted together in an ingenious and comparatively simple way. All the recent British military machines are of all-metal construction except for the covering. Stainless steel is preferred by many of the manufacturers for everything except secondary parts. However in many of the sections stainless steel cannot be used with reasonable ease, and they are therefore built of ordinary steel. Duralumin is still distrusted because of fear of fatigue, but it is widely used, especially among those who have built boat hulls and are familiar with its properties. The drawn metal sections are admittedly more expensive than corresponding wooden structures but they are also much lighter, especially in the larger sizes. It is claimed that in large quantities they would be cheaper than wood. In this respect, America certainly has much to learn from England.

ENGLAND IS ALSO far ahead of us in the actual construction and use of large flying boats. The standard British line of development, as exemplified at the show by the Short "Singapore" and the Supermarine "Southampton," is a twin-engined biplane with a large and seaworthy hull. The hulls and the spars are built out of duralumin in both of these boats. A considerable amount of flexibility is planned for and deliberately sought in the hull construction. Neither plane has complete bulkheads across the hull, and one is able to travel freely from nose to tail. There are, however, water-tight transverses running up to the floor level and two adjacent sections of the bottom can be flooded without the boats sinking. The Short has a very marked sponson, and in the Supermarine, the steps are built on a practically circular hull, the object being to obtain flexibility. The main steps of both planes are comparatively shallow but the rear step, which is only a little in front of the vertical stabilizer, is very marked and has a much sharper V than the main step. The structure supporting the tail is an elliptical extension of the hull and raises the control surfaces high above the water.

The Blackburne "Nile" is of a different type. It is a monoplane with three Jupiter engines set in the leading edge of the wing. The wing is externally braced and set very far above the hull. The hull is fitted for commercial use and seats fourteen passengers in great comfort. The exterior form is remarkable for the extremely sharp V of the bottom. Near the keel the angle of rise is over forty degrees, and though it curves out near the sides to a flatter slope, the whole angle is extremely sharp.

Two small flying boats for private commercial use were shown. One, the "Cutty Sark," built by S. E. Saunders, Ltd., is a four-seater monoplane of very pleasing and simple design. At the show it was fitted with two 105 hp. Hermes engines. It can also be fitted with three engines in which case it could fly if one engine failed. The engines are mounted high above the wing. The propellers are in line with the rear of the cabin, which is located in the bow and forward of the front spar. The other small boat was a two-seater pusher monoplane put out in France by Loire and Olivier. The construction was entirely of wood, and in design it was notable because the propeller was carried back from the engine on a long drive shaft. The bottom, following French custom, was flat. The riveting and detail of workmanship in all the British hulls were extremely good. Frames and stringers were made from drawn or bent sections, practically no extruded sections being used. Most of the boats had no exterior keels, but were fitted with attachable wheel devices for beaching purposes.

One cannot leave the field of water flying without mentioning the float seaplanes. There were several such as the Short "Mussel" and the Parnall "Peto" which were designed primarily as seaplanes, and a number of landplanes were also exhibited with floats. One of the most interesting was a Moth fitted with a single float amphibion gear developed by Short Bros. This consisted of a short stub wing or tube whose top was flush with the deck. In the tube was an axle which could be rotated. To the ends of the axle were fastened struts to which the wheels were attached. By rotating the axle the wheels were lowered or raised. Incidentally, the Short floats were beautifully built both from the point of view of workmanship and aerodynamic design. Most of the floats had concave bottoms, but some of them ran in a straight V until near the chine, where they branched out horizontally so as to divert the spray. None of them were fitted with spray strips, although the bottom angles were very steep in some cases. Also none of them had rubbing strips below the keel. Water rudders were attached to the floats in many cases.

BOTH from the point of view of numbers and interest, the pursuit planes were a dominant feature of the show. Broadly speaking, they divided into three types, the very strong easily maneuverable plane, the diving or high speed type, and the interceptor type. This latter is meant not so much for fighting other pursuit planes as for starting from ground level and catching up to a flight of bombers. It has an extraordinarily rapid climb and very good high speed at altitudes of 20,000 ft. The pursuit planes were about equally divided between water and air-cooled engines. In general, the water-cooled types which are designed primarily for speed, have long narrow fuselages and a greater span, while the radial-engined ships have shorter fuselages and shorter spans for greater maneuverability. In one very important characteristic the British pursuit or fighter plane is different from ours. None of the wings on the British planes taper either in thickness or in plan form. Except where vision necessitates it, there is no sweep back. Excellent vision is obtained by giving a good deal of stagger and by raising the pilot's cockpit so that his eyes are almost on a level with the trailing edge of the upper wing. In machines equipped with radial engines this gives the plane a rather hump-backed appearance which is not beautiful. [This practice was deliberately abandoned by our Army Air Corps several years ago in favor of putting the pilot below the level of the wing, giving him less vision upward but a perfectly clear field straight ahead.—Ed.] With the longer fuselages of the water-cooled engines this effect is not nearly so noticeable. The latest types of pursuit planes were shown, and they are a great improvement in design over the service types which flew at Hendon. On the whole, the machines are extremely clean in design. Some, however, still had excrescences, and even the Hawker "Hornet," which is claimed to be the fastest military plane in the world, had external aileron horns. One interesting feature is that duplicate lift wires are not considered necessary in England, and most of the fighting and commercial planes except in the very large sizes have single lift wires. All the pursuit planes and practically every other plane in the show were fitted with oleo landing gears. Landing gears were about equally divided between split and straight axle types. In the majority of cases the upper and lower wings are about the same size and except in the case of the Bristol Bulldog little dihedral is employed. The only exception to the rule of biplanes for pursuit purpose was a low-wing all-metal monoplane put out by Vickers. The wing covering consists of comparatively small sheets of duralumin which are riveted to each other by a special process developed by Wibault. Vickers holds the British license for Wibault's patents and designs. It was impossible to obtain exact performance figures on the British pursuit planes, but judging by appearance the new types ought to be very fast and have a good rate of climb. It should be noted that according to the Air Ministry regulations all military machines must be built of metal except the covering. The spars and ribs of the pursuit planes are all built of alloy steel of very high strength, instead of wood as is the practice with us. This perhaps accounts for the fact that the British planes have no taper, for shaping a steel spar into a tapered section is much more difficult than manufacturing a drawn corrugated spar of constant section.

There were six two-seater military machines displayed. As in the case of the fighters, they are designed for various purposes which more or less blend into each other. Day bombing and reconnaisance are the principal ones. The prettiest and cleanest of these planes were the Fairey "Fox" and the Hawker "Hart" which are in reality enlarged pursuit planes of the high-speed type. The slightly larger fuselage with the same size engine makes possible a slimmer looking fuselage, and these machines are a pleasure to look at. It is also said that they have an excellent performance, equal or superior in speed and climb to the service pursuit planes of the present day. The Fox has a wing radiator in the center section, but besides this has a retractable radiator slung underneath the fuselage. The bomb racks in most of the two-seaters were slung under the wings. As in the fighters, a fixed machine gun is used. There were also two two-bay planes in the two-seater class.

There were three two-engined military planes exhibited. The Boulton and Paul "Sidestrand," a bomber using very interesting forms of steel construction, was well worth careful study. The Vickers "Virginia" troop carrier of the type which took part in the evacuation of Kabul was also present, as was part of a Handley Page bomber. The bombers and large planes are fitted with geared engines, but here again both air and water cooling are used.

FROM THE COMMERCIAL STANDPOINT the exhibit was not as interesting as the American exhibits which are given over entirely to commercial machines. The truth is that England has not the variety of production of commercial planes that exists in the United States. Outside of the large passenger carrying planes and the light two-seaters there has been little demand for commercial aircraft in England and they have not actively pushed their Colonial trade. As a result, the commercial machines are mainly by product of the military factories. The chief exception is the DeHaviland works, which has concentrated on commercial work. The same is true to a lesser extent of the Avro. And there are three or four other purely commercial builders whose production so far has been very limited. The large multi-engined passenger planes which have been developed for Imperial Airways were not exhibited. Handley Page showed part of the fuselage of a forty-passenger plane and the Blackburn company the hull of a passenger-carrying flying boat, but outside of this there was no evidence of British development in this line.

Of course, no substantial production has been reached in these large planes. In the two-seater class, however, real production has been attained, and if the DeHaviland company continues producing Moths at the present rate it will be building more planes of a single type than any company in the United States. DeHaviland exhibited their standard Moth, a Moth Compe, and a Moth seaplane. These planes are so well known in

A general view of one end of the hall with the Ford monoplane in the middle background. Immediately in front of it is the passenger cabin of a 40 passenger plane of Handley Page design. The foreground shows some representative steel framing

the United States as to need no description A new addition to the DeHaviland line is a four seater externally braced cabin monoplane fitted with a 240 hp Armstrong-Siddeley engine showing a strong influence of American cabin monoplane design To improve visibility the wings do not extend across the cabin and a transparent roof has been fitted which is somewhat below the top of the adjoining wing

A V Roe & Co Ltd showed two three-engined cabin monoplanes in addition to the Avian These are built under license from Fokker One is a five-passenger plane, the other eight-passenger The larger machine is fitted with three "Lynx" engines and the smaller with three 100 hp "Genet Major" radial engines Both DeHaviland and Roe are experimenting with welded steel fuselages for their two-seater planes and both are also fitting some of their planes with radial instead of in-line engines

THE WESTLAND LYSANDER should be of interest to Americans, as it is a type which has been little developed either here or abroad It is a braced cabin monoplane seating six and fitted with three four-cylinder in-line Cirrus "Hermes" engines

Due to the small frontal area of the in-line engines the plane has a clean appearance The cabin is quite roomy and it is said that the plane will fly com-

[illegible] engines. Westland also showed a two-seater monoplane

Showing the tendency toward closed cabin construction was a five-place biplane fitted with a 300 hp Bristol engine There was also a neat three-seater cabin plane put out by Desoutter Aircraft around a Cirrus engine The Blackburn company showed their side by side two seater Bluebird with an all-metal wing structure Simmonds Aircraft Ltd showed their two-seater biplane, the feature of which is interchangeable wing panels and control surfaces There were two low-powered planes one a single-seater closed cabin monoplane put out by A B C Motors, Ltd, and the other an experimental low priced two seater put out by Boulton & Paul With the exception of the Short "Mussel" seaplane the only low-wing monoplane was a single-seater put out experimentally by Glenny and Henderson Lateral control in this machine was obtained by two discs projecting on tubes beyond the wing tips When the discs were turned not only would their angle to the air be altered but their shape was such as to present a lifting surface on one side and a reverse lift or inverted wing effect when the other side was rotated to meet the air stream

Cierva Autogiro Company Ltd, showed a model of their sports autogiro This machine is obviously a great advance in design over previous models It is

The Prince of Wales inspects a ring cowling (Similar to the N A C A cowling in general principle and purpose)

the first to have a special fuselage built, instead of adapting a standard fuselage The bugaboo of starting the rotor by taxiing around the field has been eliminated and it is claimed that it will take off in less than thirty yards The rotors are now covered with plywood, and are also fitted with a braking mechanism

BEFORE TURNING TO the foreign planes and accessories it will be well to indulge in a few generalities and miscellaneous comments Cowling of radial engines varies greatly Some are not cowled at all, some have cylinders cowled individually some employ a modified N A C A cowling and others the much simpler Townend ring which is essentially like the N A C A design in basic principle and which is claimed to be equally efficient Gearing of engines is much more prevalent than in this country Slots are in use on about one third of the machines, both commercial and military They vary greatly in length and even in design, but none were shown covering the whole length of the wing Ailerons of the Frise type are very prevalent Ailerons are put on the lower, upper, or on both wings there being no marked preference Wheel brakes are beginning to put in their appearance, but are not nearly as widely used as in this country There were no amphibion flying boats at the exhibit Folding wings, especially in the smaller commercial planes, are much more prevalent than in America Adjustable stabilizers are little used in the smaller planes In the larger planes they are all hinged on the leading edge of the stabilizer and are raised or lowered at the rear Oleo gears are almost universal Thin wing sections are generally used and taper is exceptional

The show at Olympia had a few more foreign planes than our so-called International shows but the floor space taken by them was small compared to that given over to British products By far the most important foreign exhibit was the Wasp-engined Ford Not only was it the largest passenger-carrying airplane on the floor but it was very much lower in price than most of the planes employed on foreign air lines This fact alone will attract much attention to it on its coming tour through Europe With the exception of Heinkel and Macchi seaplanes, which are semi-military, the foreign exhibits were all of commercial planes France was represented by two Farmans a Potez two-seater, and a two-seater Loire and Olivier flying boats These planes were of wooden construction, and Farman still sticks to piano wire controls Somehow they did not seem to be up to the British displays in either design or workmanship. The Italian machines were interesting Fiat showed a very pretty high wing two-seater monoplane at 100 hp Two struts ran from the rear spar over the pilot's head to the lingerons allowing doors to be cut for access into the seats Breda displayed a two-seater closed-cabin monoplane which looked well except for poor vision All the foreign airplanes were monoplanes and on most of them the ailerons extended the full length of the wing. Junkers showed their new two-seater monoplane, which with its low tapered wing gives a very pleasing impression Dornier and Rohrbach exhibited models of their planes, and there were various German technical exhibits of airdromes, etc Klemm-Daimler showed their little monoplane

Accessory booths were distributed around the walls of both the large and small halls and also around the galleries that surmounted these Bendix was there with John Cautley in charge Scintilla had a booth, but Tom Fagan was missing. Everything was displayed, from hangar doors to pneumatic drills There were perhaps more exhibits of different metals and worked metal parts than at an American show, and aeronautical accessory exhibitors were perhaps more often large firms who had a side line in aeronautics, but on the whole one might have been wandering around at Detroit or Chicago except that the names were different Tires, tools, and Titanine were exhibited side by side with publications, parachutes, and petrol pumps in distracting displays Most of the exhibitors had partitioned off part of their display space into a sort of private office The principal air transport lines of most of the European countries had displays, and there were also several displays from foreign research laboratories Marconi had a fine showing of wireless apparatus There was a complete exhibit of weather-recording instruments for airports There were also several displays of aircraft instruments but somehow they did not impress one as being particularly original, and certainly not as being any better than ours On the whole there were few ideas among the accessories which have not been tried in this country There were, however, a few which ought to be of interest First was a single-spar frame for a monoplane wing for which great things are claimed There was a siren which through a vane attached to a wing strut, gives warning when stalling speed is approached There was a display of hollow metal propellers welded at the seams There were chemical bombs which when dropped to the ground emit smoke showing which way the wind is blowing There was a variable pitch propeller, and a wonderfully complicated caterpillar landing gear. Palmer exhibited a brake band which is put into action by the expansion of an inner tube which lies under the lining This is worked either by compressed air or by hydraulic pressure There was a supply house specializing in airplane servicing and maintenance equipment Perhaps the most popular device with spectators was the Reid apparatus for testing the rapidity and accuracy of an individual's reaction in order to find out if he will make a good pilot The accessories as a whole were well displayed, and would have repaid more time than most of the visitors had to give them

CONSIDERING the spell of hot weather, very considerable crowds attended the show, with a probable average of about five thousand people a day And it must be remembered that the show was primarily military Where our exhibitors go into a huddle with dealers and distributors the British, if such a phrase is not too undignified, go into a huddle with Afghans and Siamese Groups of important-looking foreigners, American, European, and Oriental, were constantly being escorted through the halls and among these was our own Bill MacCracken There was nothing radically startling shown at the exhibit, but there was much that was of interest Although we may differ with the British in our ideas on both structure and aerodynamics, we must admit that the workmanship of the British planes seemed excellent The planes on the whole had a finish of construction which gave confidence in the product Both from the manner in which the show was staged and the quality of the planes, the exhibit at Olympia commanded the respect of the American visitor

700 TO 1,000 Flying Hours BETWEEN MAJOR OVERHAULS

How Parks Air College, Inc., Has Increased the Operating Life of Its OX-5 Engines; First of a Series of Three Articles About the Service Organization of the School

BY JAMES P. WINES

HEARING a person say that he obtains from 700 to 1,000 hr between major overhauls on an OX 5 engine—and that this is done regularly on 30 engines used in student training—would lead one to believe that that person was highly imaginative to say the least However, "Murphy" Shedenhelm will not only tell you that, but he will show the log books to prove it, and then he will explain how it is done. Murphy, it might be explained, is the service manager for Parks Air College, Inc., East St. Louis, Ill., and it is his duty to keep the OX engines that power the school training planes in operating condition.

"Murphy" Shedenhelm

Both the great care and thoroughness with which the actual overhauling work is performed by the Parks service organization and the rigid system of inspection and maintenance that is in force have a great deal to do with the length of time that the engines may be operated before it becomes necessary to tear them down for overhaul The handling of the engines in the air, of course, likewise affects the operating life With the planes used for dual instruction, Murphy says, the average time between top overhauls is from 200 to 375 hr, while it takes a solo student, many of whom are "full gun artists" in spite of all admonitions to throttle down their engines, only from 125 to 250 hr to place them in the shop This accounts in part for the variation in time between major overhauls

There is an old saying that "necessity is the mother of invention," and in the case of Parks Air College it is more than true The Parks school is now operating 28 training planes powered with OX-5 engines Twenty-seven of these planes are three passenger, open cockpit, Travel Air biplanes, while the other is a "Robin" manufactured by Curtiss-Robertson Airplane Manufacturing Company The Travel Airs are used for instruction and solo work, and the Robin to provide training in a plane of the small cabin type The school also has planes of other types, equipped with more powerful engines, which are used for other purposes such as night flying

With the growing number of students that the institution has handled since it was opened April 15, 1928, it has become increasingly necessary that the greatest possible efficiency be obtained from the power plants Forced landings were something that could not be condoned Although southern Illinois is practically all landing country, a nervous solo student might "crack-up" if he were forced down, and for that reason a forced landing constitutes a danger, not only to the plane but to the student as well What is more, such a landing would place the plane out of commission for a time, and time in the operation of a flying school is money As a result, the system now in use was gradually evolved Its excellence may be judged by the long periods between both top and major overhauls and the rareness of forced landings A forced landing is said to occur on an average of once in every 331 hr of flying

APPROXIMATELY one half of the Parks fleet of training planes is operated in the morning, while the remainder is used in the afternoon The students, likewise, are divided into two groups so that about half of the 271 now enrolled in the flight school flies in the morning while the other half flies in the afternoon This system makes it possible to perform the daily inspections and any necessary repairs or adjustments on the planes flown in the morning the afternoon of the same day The planes to be flown by the group taking flight instruction in the afternoon, of course, are inspected and worked on in the morning. The line inspector, who is a mechanic, performs the daily inspections which include checking the valves, cooling system and breaker points of the engines, as well as a check of the planes He also makes any minor adjustments If there are repairs to be made, a ticket is made out and the plane is turned over to the chief service mechanic

One of the OX-5 Travel Air planes taking off

As an added check on the planes and engines, the pilot makes a daily report, which is turned over to the chief mechanic before the pilot leaves the field. In the cockpit of each plane, there is a pad of mimeographed "Flight Reports" together with a pencil The report pad is placed there so that the pilot may make any notations on the performance of the plane that he cares to while in the air This is to forestall any forgetfulness on his part Aside from his remarks on the condition of the plane and engine, the form has spaces for the license number of the plane, the date, the hours it was flown that day and the pilot's name.

From the flight report, if any repairs are needed, the chief mechanic makes out a shop card This card also gives the date, the type of plane, its number, and, in addition, the name of the mechanic assigned to the job, the name of the person inspecting the work upon its completion, the list of repairs and any remarks. Entries in the log are made from the shop card after the work has been done, and it is then kept on file for 30 days in case there is need to refer to it. The back of the card, incidentally, is used to list the parts withdrawn from the stockroom, giving a check on the stores in addition to the storeroom keeper's record.

THE PLANES are washed daily with water This comes under the supervision of the field chief, who is responsible for seeing to it that the magnetos are covered during the operation. Every other day also the engines are washed with gasoline to remove any excess oil that

A view of Parks Air College, Inc., showing a portion of the fleet of training planes on the line

may have accumulated. This procedure is followed to reduce the fire hazard insofar as possible. Every 15 hr. the oil in the engines is changed and every 30 hr the oil screens are removed and cleaned. For the 100 hr inspections required by the Department of Commerce, the planes are grounded, and are inspected from spinner to the rudder post.

It is interesting to note in this connection, when a plane is grounded for an inspection or because there are extensive repairs that must be made, that the line in-

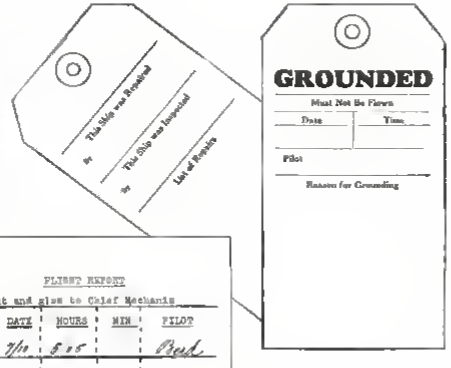
An aerial view of Parks Air College, Inc., East St. Louis, Ill. Note the students' dormitory across the railroad tracks

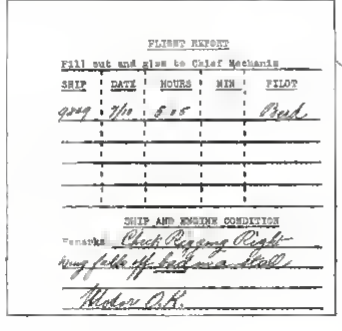
spector attaches a red tag to it. The tag says 'Grounded,' and it means just that at the Parks Airport according to officials. It can be removed only by the line inspector, and if anyone were to remove it or to fly the plane, it would mean the loss of his position. The tag, by the way, has spaces for the date and time, the name of the pilot, the reason the plane was grounded, the signature of the mechanic who makes the repairs, the name of the person who inspects his work and the list of repairs.

At the end of each 500 hr. of operation, the OX engines used in the training planes are jerked and are taken into the overhaul shop for inspection. The oil, naturally, has been drained and the engine to be inspected is placed upside down on a stand. The lower half of the crankcase is removed and the bearings are thoroughly checked. This is done by connecting a copper tube from a pressure tank, manufactured by Curtis Pneumatic Machinery Company, St. Louis, Mo., to the oil pump connection. Two gal. of light oil contained in the tank are then forced through the oil circulating system under a pressure of from 60 to 75 lb. If the bearings have developed any leaks, this test will reveal the fact; but it is seldom, according to Mr. Shedenhelm, that there is any work to be done. In rare instances, he says, the camshaft bearings have become leaky, but this trouble has been practically eradicated by the use of bearings constructed of an alloy of 115 Brinell test hardness.

The valves in the OX engines are never allowed to blow, Mr. Shedenhelm, who is much better known as Murphy, reports. As a result the school is said to obtain as much as 1,000 hr. of service from them. The rigid inspection system makes this possible. The blowing of valves is caused by excessive wearing of the valve guides and a perceptible wearing of the guides is usually noticed in the inspections two or three days before it would cause any damage. The line inspector, finding that this condition exists has the engine sent to the shop immediately for top overhaul.

The general condition of the engine and a variation in the oil pressure of 25 lb., are, for the most part the governing factors in connection with major overhauls. The variation of pressure indicates that there is a leak in the lubrication system. This usually is found to be the result of the wearing of the connecting rod bearings which causes the engine to throw oil. The pistons of the OX-5's used in the Parks training planes are not fitted with oil scraper rings, and consequently the engines are torn down when the wearing of the bearings makes itself apparent. Breakage, of course may also necessitate a general overhaul, but this is a minor cause so far as engines used by the Parks school are concerned.





Above: A reproduction of one of the tags used at Parks Air College when a plane is grounded. Left: The shop card, which is filled out when repairs are to be effected on a plane or engine, and the flight report of the pilot from which the entries are made on the shop card

THE PREST "Baby Pursuit"

Single Place, Anzani Powered Monoplane is Characterized by a Diamond Shaped Fuselage

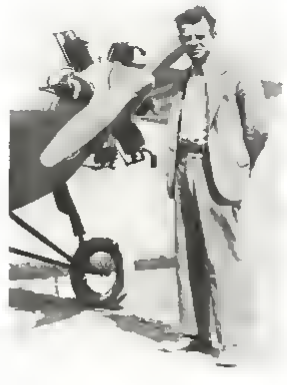
By Charles F. McReynolds

THE PREST "Baby Pursuit" represents a definite effort to build a plane specialized for the low horsepower single place field. In developing this plane Mr. C. O. Prest has been able to obtain basic patents on the fuselage construction.

In flight tests some remarkable performances have been reported although the power plant used is an Anzani 45 of only 45hp. Loops from level flight without loss of altitude, climbing spins, barrel rolls in level flight without loss of altitude, and right and left roll into normal flight from the top of a loop have all been performed by C. O. Prest, designer and builder, who first flew the plane; L. Kay, mail pilot on the Varney system, and Eddie Martin, of Martin's Airport, Santa Ana.

Rigidity of the various parts has been demonstrated during every maneuver, there being no flutter in either wing or empennage even during a prolonged power dive. The plane has been designed with a high load factor in low incidence, and is exceedingly rugged throughout. A remarkable feature of the performance tests has been the unusual control achieved with tail surfaces of abnormally small size. This is credited to the undisturbed flow of air around the patented fuselage which is of diamond shape section and of excellent fore and aft streamline.

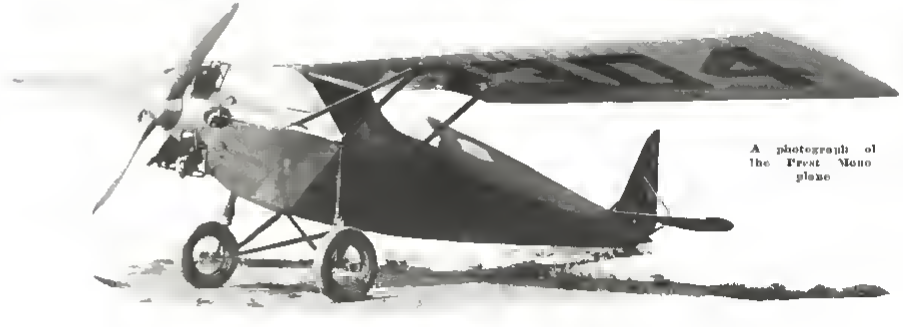
The Baby Pursuit is a parasol type monoplane of 26 ft. span, the outstanding feature being the diamond shaped fuselage section which is essentially four triangular truss systems. It is said that any two of the lateral fuselage strut systems could be completely destroyed without decreasing the strength of the fuselage below the requirements for all normal flight loads.



Clarence O. Prest, designer and builder of the Baby Pursuit, standing in front of his airplane

Because of its diamond section, the fuselage lends itself readily to an efficient system of wing and landing gear bracing, the semi-cantilever wing being mounted at the center to fittings on the upper of the four fuselage longerons, and being braced by three short struts on each side to the middle longerons. A shock strut extends from each of the side longerons to each landing gear axle, the axles being shorter than usual because of the lower position of the lower fuselage longeron.

Accurate performance tests have determined the top

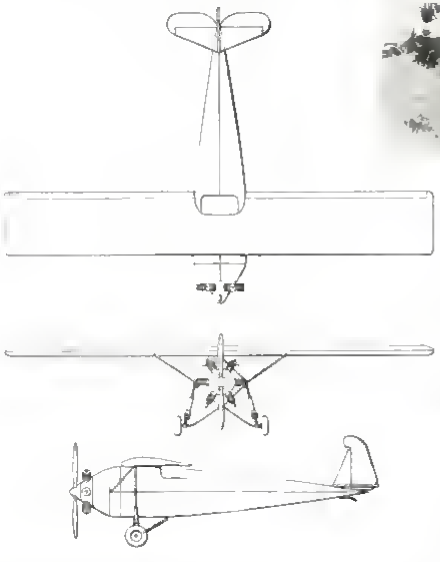


A photograph of the Prest Mono plane

speed of the plane with the Anzani 45 to be 100 m p h climb 1,000 ft per min at sea level, and landing speed 45 m p h.

Built in one panel with six bays of double wire drag bracing, the wing has a total weight covered of 122 lb Since the total wing area is but 95 sq ft it is apparent that the construction is very rugged Five compression members of chrome molybdenum steel tubing are bolted to the wing through heavy steel fittings, the bolts being carried into plugs which are screwed into the compression struts Ribs are spaced 12 in apart across the wing and are nailed to the laminated spruce spars The wing chord is 48 in and is constant from tip to tip except for a cut out above the pilot's cockpit Aerotruss brazed steel ribs of Gottingen 398 section are used A heavy spruce nose piece is used along the leading

Right—A side view of the "Baby Pursuit" Below—A three view line drawing of the airplane



edge while the entire trailing edge is taken up by the ailerons, each of which is 11 ft long and but 4½ in wide These ailerons are of steel tube construction and are mounted to the rear spar on outriggers with strap hinges passing around the forward spar of the aileron, which is tubular This construction permits the ailerons to rotate around the center of the front spar and permits of practically no gap on either upper or lower surface The lateral control attained by this method is said to be unusually effective Wing tips have a rake of one foot on each side and balso wood fairing is used to streamline the tips

All fuselage members are chrome molybdenum steel tubing fittings also being of chrome molybdenum steel Tubing sizes vary from 20 to 16 gage and from $\frac{7}{8}$ to $\frac{7}{8}$ in diameter Howe truss welded construction is employed the four longerons being arranged with two side members one top and one bottom, the top longeron being cut out at the pilot's cockpit and bridged around so that no strength is sacrificed Overall length of the fuselage is 18 ft and the diagonals giving width and depth are 35 in each way, inside measurement at the widest point. Dimensions of the pilot's cockpit are 35 in wide and 29 in deep Because of the maximum width being at the center line of the fuselage, visibility from the pilot's cockpit is extremely good in all directions

A spring cushion is fitted in the pilot's seat but may be removed to provide room for a seat pack parachute Consolidated type "A" instrument panels will be standard equipment, carrying tachometer altimeter, oil pressure and temperature gages, and engine switches All controls are operated by wire cables running over duralumnum pulleys to horns, conventional stick and rudder bar controls being standard in the cockpit All wires run beneath the floorboards

The fuselage structure is sealed during construction and finished with red oxide primer and lacquer Nashawena fabric, sewed on is used for covering both wing and fuselage. Standard colors will be black fuselage and silver wings and tail surfaces, the finest grade of pigmented acetate dope being used on the fabric

Wing struts are but 36 in long and are of 18 gage chrome molybdenum steel 1½ in in diameter two parallel lift struts being used on each side and a pair of drag struts being carried forward from the front spar wing strut fitting to a fitting on the center longeron each side of the fuselage This mounting is extremely rigid and has a high factor of safety all bolts being of nickel steel and ¾ in diameter It is said that the wing may be mounted or dismounted by one man in ten minutes

Divided axle landing gear is standard equipment, tread being 6 ft and Gruss shock struts standard Tires are 20 by 4 in United States A leaf spring tail skid is mounted to the tail post

An eight-gallon gasoline tank carried in the fuselage just forward of the pilot's cockpit provides a cruising radius of 250 mi and furnishes fuel to the engine by gravity feed The oil tank, of two-gallons capacity, also feeds by gravity

Aluminum cowling is carried around the engine from a point just forward of the cockpit to a spinner on the wood propeller, which is of Story manufacture

Although the "Baby Pursuit" has been test flown with the Anzani 45 engine it may also be equipped with the Salmson 9-AD engine such as is used on the Aeromarine Klemm monoplane There is at present no

A close up of the nose of the Prest Monoplane showing the unusual shape of the fuselage section

American engine of the proper size to power this plane but a four cylinder radial air cooled engine of two cycle type has been designed and is now under construction at the Prest factory. This engine is expected to be ready for flight testing within 90 days, and if satisfactory will be used on all production models

The Prest engine is built around a new principle for which patents have already been applied Although of two cycle type, the mixture will be furnished to the cylinder by means of a blower instead of through crank case compression Also, instead of drawing mixture into the cylinder through a port at the bottom it will be introduced through a mechanically operated valve in the head of the cylinder, exhaust being through ports as in other engines of this type By eliminating crank case compression of fuel, lubrication troubles are said to be eliminated Since each cylinder fires on every stroke the overhead valves may be operated from a cam mounted directly on the propeller shaft, thus eliminating any gears from the engine One engine of this type has already been tested and proved practical

Construction is now underway in the Prest factory at Arlington, Calif., on two planes one of single seat construction and the other a two place craft The two place plane will be of parasol type with the wing mounted several inches above the fuselage, V struts being employed between the wing fittings at the center, and the same fuselage longeron fittings as are used on the single place plane

Manufacture of the new Prest planes will be conducted in the present factory building which is of ample size and has been completely jigged and tooled for a production of one plane per week at once, and one a day soon after production starts.

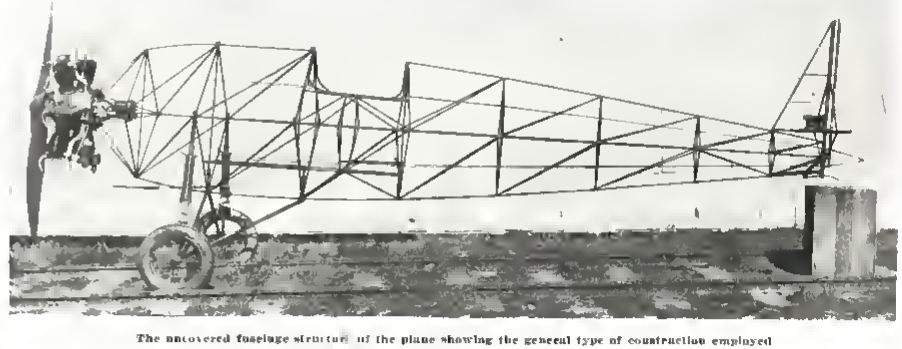
C O Prest has had many years of experience in designing, building, and flying airplanes, and has also had considerable experience with building and operating two cycle engines He is a member of the Early Birds, learned to fly in 1911, has been flying ever since and has built eight different types of airplanes of both monoplane and biplane type, all of which were successfull craft.

Specifications of the Prest "Baby Pursuit" as supplied to AVIATION by the manufacturer are

Length overall	18 ft
Height	5 ft 6 in
Span	26 ft 1 in
Chord	48 in
Angle of incidence	zero
Wing area	95 sq ft
Weight of wing complete	122 lb
Weight of fuselage strip	61 lb
Weight of plane empty	500 lb
Gross weight loaded	725 lb
Wing loading	7½ lb per sq ft
Power loading	16⅔ lb per hp

Performance according to manufacturer

High speed	100 m p h
Landing speed	45 m p h
Climb	1,000 ft per min
Service ceiling	above 10,000 ft
Cruising range	250 mi



The uncovered fuselage structure of the plane showing the general type of construction employed

SOME PERTINENT FACTS ABOUT

Aviation Engine Oils

By F. R. Staley

Chief Chemist, Texas Pacific Coal and Oil Company, Fort Worth, Texas

SINCE THE WORLD WAR much progress has been made by the petroleum industry in the manufacture of lubricants suitable for aircraft engine lubrication. Progress and improvement in engine design is effected by close co-operation between the designer and the lubrication engineer. One of the first lubricants to be used for aviation engines was Castor oil. This oil is still extensively used in Europe. It has several advantages over mineral oils and also some very decided disadvantages. It does not "thin out" as much with increasing temperature as do most mineral oils. In other words, it shows a minimum change of viscosity with temperature change. It also possesses a valuable lubricating property known as "oiliness" which is not entirely understood but is the tendency of the oil to adhere to or "wet" the metal. The limitations to the use of Castor oil are its high price, the tendency to decompose and deteriorate in storage, the formation of gums in the engine when subjected to heat for any long period of time, and the lack of a viscosity range. It is possible to obtain mineral oils in a wide range of viscosities. The specifications for Liberty Aero Oils include oils having a viscosity of 75 seconds Saybolt at 210 degrees Fahrenheit to 125 seconds.

Most all of the aviation engine oils used in the United States are refined from crude petroleum. According to their composition and the difference in their physical and chemical properties crude oils and the lubricating oils produced from them can be divided into three general classes: paraffin asphalt and mixed base. Paraffin base oils, which are the highest priced oils, contain paraffin wax, asphalt base oils contain asphalt, and mixed base oils contain both paraffin wax and asphalt.

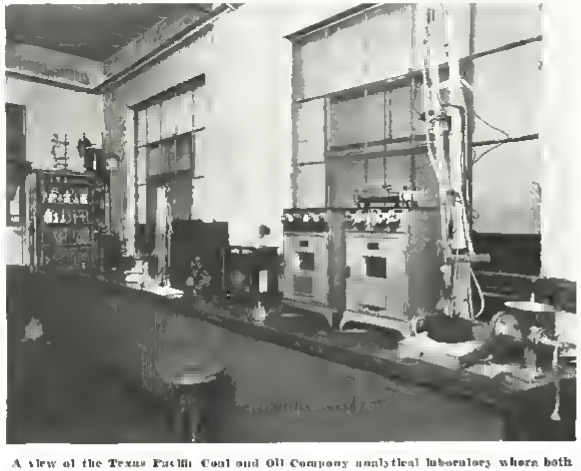
In order to produce a satisfactory aviation engine oil from one of these crudes it is necessary to remove the asphalt or the wax since neither one of these substances is a lubricant. Refining of petroleum usually consists of four steps:

(1) Distillation, which separates the oil into gasoline, kerosene, gas oils and lubricating stock.

(2) Chemical treatment to remove impurities from the raw materials.

(3) Filtration by means of fine clays or Fullers earth to improve the color of the oil.

(4) Dewaxing in which the oil is chilled to a low temperature to precipitate the wax which is then pressed out or removed by means of a centrifuge similar to the one used for the separation of cream from milk.



A view of the Texas Pacific Coal and Oil Company analytical laboratory where both raw and finished products are subjected to exacting tests

Until recent years paraffin base oils were limited to summer use due to their high wax content which caused them to solidify at comparatively high temperatures although their superiority at the higher operating temperature of the engine is recognized.

The extensive use of the airplane in the United States demands an all-weather oil one that shows a minimum change over a wide temperature range. An engine might be started in zero weather and be flying in a tropical temperature before a landing is made. In order to produce an oil to meet the requirements for such service, petroleum chemists and engineers devised methods of completely removing the wax from the paraffin base oils. The effect of this was to lower the pour point of the oil, or the temperature at which it would solidify. The result is that heavy paraffin base oils suitable for aviation engine lubrication have been produced that will flow at sub-zero temperatures making starting easy and maintain an excellent lubricating film at the maximum working temperature of the engine.

In the study of lubricating oils viscosity is usually considered the most important property. It may be defined as the resistance of a liquid to flow. It is measured in the laboratory by means of an instrument known as a viscosimeter. The time in seconds required for a definite volume of the oil to flow through a standardized orifice at a constant temperature is expressed as the viscosity. The temperature is very important since the viscosity changes with temperature—the oil "thins out" at higher temperatures and "thickens" considerably at lower temperatures. Castor oil shows less change in viscosity with temperature than paraffin base oils while asphalt base oils show greater change in viscosity with temperature than paraffin base oils.

In considering an oil for cold weather starting a property known as "fluidity" is very important. Mathematically this is the reciprocal of viscosity. An oil having a good fluidity at low temperature is one that will pump readily and not congeal and become stiff or plastic. A dewaxed paraffin base oil shows better fluidity at low temperature than an asphalt base oil, when each has the same viscosity at 210 degrees Fahrenheit.

FROM THE STANDPOINT of safety and economy the oil consumption is important. This is indicated by the volatility test. It is a measure of the percent of the oil distilled off at a given temperature. An unblended paraffin base oil shows the lowest volatility when compared with other oils of equal viscosity.

Stability in service is likewise of importance. When subjected to engine temperatures most aviation oils have a tendency to break down, forming carbon and sludge in the engine. One of the disadvantages in using Castor oil is its tendency to form gummy substances which deposit on the valves and other engine parts. Some aviation oils show this tendency more than others. "Pretreated" paraffin base oils practically eliminate this disadvantage. Petroleum chemists have adopted a test known as "carbon residue test," which indicates the carbon-forming tendency of an oil. An oil showing a very high carbon residue will usually deposit an excess amount of carbon in the engine.

A section of the physical laboratory of Texas Pacific Coal and Oil Company for testing new process

The engine laboratory where Texas Pacific Coal and Oil Company tests the quality of various lubricants

IN THE DEVELOPMENT of oils for the modern aviation engine, engineers and chemists realize the importance of actual performance tests as well as laboratory analysis and specifications. The significance of the various tests can be checked against the results obtained in service from a given oil. Specifications, when intelligently made and proper methods set up for their tests, are essential to insure uniformity and to determine the nature of the oil used, but very often the salesman puts too much emphasis on specifications without mentioning performance which is the ultimate test of an oil. A single performance test may not be sufficient to completely demonstrate an oil since there are many more variables to control than in a laboratory test. Both laboratory and performance tests are essential in the selection and use of an aviation oil, and the more information available the easier it is to make the decision.

It should be remembered that in the manufacture of an aviation oil there are two essentials to be considered:

(1) The crude petroleum from which the oil is refined, and,

(2) The method of refining it.

A brand of oil may be made from a great variety of crude oils having very different characteristics, or it may be made from various blends of crudes, the proportions of which vary from day to day, consequently in either case uniformity or consistent performance is very nearly impossible, even though the package and the grade does not change. There are a limited number of refineries in the United States that refine only one crude from one area and consequently produce a very uniform product. With regard to refining methods, many of the refineries have large research staffs that are constantly trying to improve their aviation oils and many refineries have spent huge sums to install modern equipment during the last two years.

Refining methods are next in importance after the selection of the crude oil. Refineries may produce finished oils of entirely different quality. A poor crude will not produce a superior lubricant but a very inferior lubricant can be made from the best of crudes if mishandled.

Ford Motor Company AND AMERICAN AERONAUTIC DEVELOPMENT

Mr. Ford Shows His Experimental Engine to Members of the Press; Comments on Future of the Airplane; the Company Issues Complete Report on First Year of Operation of Ford Airlines

By John T. Nevill

SO MANY and so varied are the secret experiments and the outward activities of the Ford Motor Company since the company's entry into the aviation industry approximately four years ago, that it is indeed a difficult matter to pick up the threads at this time and trace them back to their origin. Since, after all, the origin does not really matter, the writer will not attempt to do that in every case.

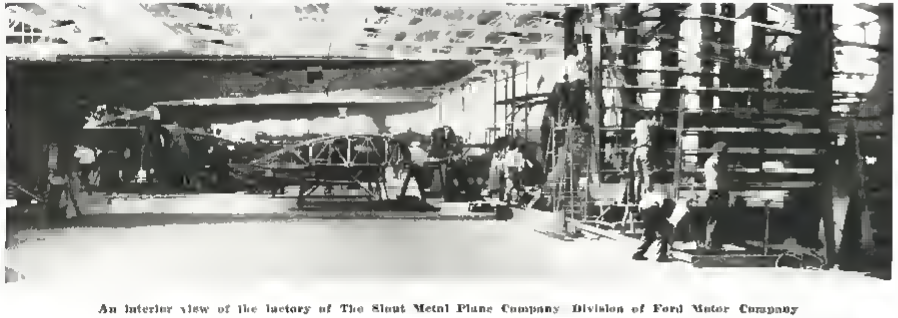
Many of Henry Ford's experiments in various phases of the industry are known facts. Others have remained rumors, and still others it is safe to assume have never become known. In this connection it is also safe to assume that Mr. Ford, with the unlimited resources at his command, and with his already proven belief in the industrial future of aviation, has overlooked no development with a vestige of a possibility. Certain experiments he is known to have begun and apparently given up for reasons which thus far have remained his own. Other experiments have apparently been stopped for reasons the public can guess at. The word "apparently" is used because there has never been any confirmation that the supposed relinquished experiments have been stopped. Perhaps they have been given up. Perhaps they have not.

At any rate, the only purpose of these articles is to picture the environment that brought the Fords into the aeronautic industry, and outline the achievements of the company since their entry. Only those unfinished experiments that have become generally known and have excited the interest of the general public will be touched upon. Such experiments include a large air cooled "X" type engine, a Diesel type engine, the Ford "flivver" plane, a two cylinder, air cooled engine, which was successfully flown in that plane, and a considerable amount of radio communication work.

As early as October, 1925, Henry Ford, himself, announced his X type air cooled engine by showing it to newspapermen. On the sixth day of that month he led a group of them into his immaculate Dearborn laboratory (immaculacy is a characteristic of any part of the Ford empire), pointed out the experimental engine, and explained its features. Briefly, the engine had eight air-cooled cylinders, developing a total of 200 hp. and weighing about two pounds to the horsepower. Four banks of two cylinders each, set at right angles to each other emerged fro ma barrel-shaped crankcase. The crankshaft was about 14 in. long and designed for a minimum of vibration. The cylinders and cylinder heads, of course, were fluted for cooling, and the valve seats were of bronze, shrunk into place. Every part was said to be surprisingly accessible and easily removable. Each set of four cylinders operated on a single arm of the crankshaft, with a connecting rod arrangement that did away with the master rod.

That engine was called the first "Ford engine of the air." At that time it was admitted to be "in the experimental stage," and Mr. Ford made no announcement of definite plans for its production. It has never been placed in production.

Information divulged by the motor car manufacturer about his eight cylinder airplane engine was unexpected and entirely in line with the surprising way Mr. Ford at times, reveals his interesting activities. Primarily, the occasion was one of those periodic interviews he grants to newspapermen at which he "loosens up" and sends the scribes rushing back to their respective papers with considerable "hot" front page "copy." Some of his remarks on that day should prove of interest here.



An interior view of the factory of The Sheet Metal Plane Company, Division of Ford Motor Company

"I HAVE BEEN QUOTED as saying that the first commercial airplane reliability tour proved the airplane to be reliable," Mr. Ford said. "Perhaps I did say that, but I doubt that the tour alone, could prove such a thing. I am a newcomer at this aviation business, but I can see that it is going to be a great industry.

"Aviation is bigger in possibilities than anything else in the world. Too big to be a one-man patent concern, too big to be any one man's contribution to science. Patents are silly things when they are used to hinder any industry. No man has a right to profit from a patent only. That produces parasites, men who are willing to lay back on their oars and do nothing. If any reward is due the man whose brain has produced something new and good, he should get it through the manufacture and sale of that thing.

"We take patents on our own developments or discoveries only to prevent others from freezing us out when they may chance to make the same discoveries. We use patents to prevent a shut-out game. We believe in the Gospel of Use. Besides, a patent is very seldom wonderful. There is nothing new under the sun. We thought we had something fine when we invented the little gear just under the steering wheel to make the steering of our cars easier. Then we found out that a piano tuner had discovered the same principle in 1826, and used it to tune pianos—identically the same gear arrangement.

"In every new development there is always a large element of common property. For example. We got our magnetos from Faraday's book, and he got his idea from seeing a current generated by a coil passing a charged magnet.

"Many of our patents have been picked up and used by others. When a thing is useful it is bound to come into use. Patents cannot stop it."

Here Mr. Ford explained that he had no intention to manufacture his airplane engine to sell separately. "We have never sold our motor car or tractor engines separately," he said. "similarly, we fully expect to use all the airplane engines we produce. They all will go into the planes we manufacture.

"All I am doing," the manufacturer continued, "is helping to get ready for the flying generation that is coming. This new art belongs to the younger people. Here in my own family, it is Edsel who is mainly responsible for what we are doing. His is the generation that may live to see the airplane become a common-place, every-day utility, rather than something unusual which it still is today.

"Of course, one of my biggest interests in the airplane is that it may prove to be a destroyer of war. I think that will be its biggest service. Tennyson saw it when he wrote:

> "'When I dipt into the future far as human eye could see,
> Saw the Vision of the World, and all the wonders that would be,
> Saw the heavens filled with commerce, argosies of magic sails,
> Pilots of the purple twilight, dropping down with costly bales,
> Heard the heavens fill with shoutings, and there rained a ghastly dew
> From the nations' airy navies grappling in the central blue;
> Till the war-drum throbbed no longer, and the battle-flags were furled
> In the Parliament of Man, the Federation of the world.'"

Having quoted this bit of poetry, Mr. Ford delved into his own expression as to how the airplane will become a dove of peace.

"The airplane," he said, "is going to enlarge the work of the automobile. The motor car has mixed the people up so thoroughly that one can hardly fool any American about any part of his country. But they can be fooled about other parts of the world. The airplane will stop that. In a motor car you can go almost anywhere land exists. In an airplane you can go almost anywhere a man can breathe. With the development of such devices as the supercharger it is possible to go places where a man cannot breathe under normal circumstances. When the plane becomes popular it will put power into the people's hands, just as the motor car has. And when international financiers or politicians, propose a war the

people will ask why. They will make short work of the war-makers

"The most useless thing you can do with a man is to kill him. We have room on this planet for many times the population we now have, it requires only one per cent of a man's energy to maintain him; why waste the earth's best product—humanity—by killing it?"

Asked whether he thought the proper preparations were being made to encourage aviation he replied

"In the automobile industry we began to produce cars in considerable numbers before we had any good roads. After the cars were in existence the roads followed. They simply had to come. It will be the same with airplanes. Get the planes and you soon will have the landing fields, the airways and the remainder of the ground equipment."

Reverting to his air cooled experimental engine the manufacturer expressed his views on the question of using water or air cooled engines in airplanes. "Water cooling and ignition problems," he stated, "have been causing most of the trouble in aircraft engines. Water-cooled engines seem to be the most logical type for use in boats. Why should not the air cooled type be most logical in the air. There is plenty of air, so why not do away with water?"

All that mind you, was in October, 1925, three months before the disastrous fire of Jan. 17, 1926, and four months before the Ford airlines began carrying the mails on Feb. 15, 1926. Although Ford did not mention it, his company even then must have been building, or at least must have been designing the first Ford tri-engined monoplane which was to be equipped with air cooled engines. Subsequent events showed however that it was not powered by the 8 cylinder Ford engine but by three Wright "Whirlwind" engines. As related in the previous installment this plane, its engines and a considerable number of additional Whirlwind engines as well as a Packard geared engine with which the company had been experimenting were destroyed in the fire.

Use of the Wright engines however did not mean that the Fords had ceased development of their own, for on the day the mail lines were inaugurated at a time when the second tri-engined plane was still about four months from its flight tests (these flights did not begin until June 11, 1926) Henry Ford took a number of his guests into the laboratory and showed them the Ford engine on its block.

That the Ford Motor Company was "in the game to stay," was evidenced by the rapidity of reconstruction work following the fire. Almost immediately operations were resumed in temporary quarters and the present, much larger factory building began to rise from the ashes of the first. The new building, in fact was to be three times as large as the former one. It was to have 60 000 sq. ft. of floor space, and laid out according to the Ford method of progressive production. It was to be 120 ft. wide, 500 ft. long and one story in height. There would be a steel and glass roof along its full length, with no supports. The company at the same time announced plans for a new hangar—the huge building that today stands just east of the airplane plant. Work on both buildings took place simultaneously.

While this reconstruction work was going on other things were occurring. On Feb. 13 the company announced the purchase of 1 400 acres of land straddling the state boundary line at Maynard, Ind., and Lansing, Ill., approximately 25 miles southeast of Chicago, a portion of this to be used as the Chicago terminal of the Ford airlines. Since the establishment of the Detroit-Chicago inter-plant aerial express line, just 10 months before, the company's planes had been landing at Maywood. The new location would obviate the necessity of traversing the thickly populated sections of Chicago residential districts, and would place their air terminal just six miles from the company's automobile assembly plant at Hegewisch.

The announcement emphasized that no manufacturing activities of any sort would take place at the Lansing terminal. A modern cantilever roofed type hangar 123 ft. long by 103 ft. wide was to be built upon the field. Plans for another hangar, to be built on the municipal airport at Cleveland also were announced.

Two days after the Chicago field purchase announcement the company began its delivery of air mail. Following completion of the Lansing airport it was necessary to open a shuttle line between the Lansing and the Maywood fields in order to carry the mail into Manhood. A small biplane was purchased and used for that purpose.

On April 13, 1926, just one year after the Ford airlines had been placed in operation, the company made a complete report of its operations during that year, and while doing so made two important announcements as to its future activity. One announcement was that the company would confine its airplane production to the multi-engined type; the other that the company was installing radio direction finding and communication equipment on the Dearborn airport and intended to test it out in the near future. More about those two announcements later. For the present let us look at their operation report.

Of 663 trips undertaken, the report said, 649 were completed, showing an efficiency record of 97 per cent. On the Detroit-Chicago run Ford planes covered 168 495 miles, were in the air 1,791 hr., and had carried 635,221 lb. of Ford freight, not including the United States mails that had been carried since the 15th of the previous February. On the Cleveland run (a shorter line) an even better record had been set. Of 457 trips undertaken this line had completed 453, an efficiency record of better than 99 per cent. Since its inauguration on July 1, 1925 the Detroit-Cleveland planes had put in 688 air hours, covered 57 531 miles, and, besides the mail, carried 409 181 lb. of freight.

During the full year's operation the Chicago line had suffered 21 scheduled trips cancelled because of weather conditions, the principal reason being poor visibility. It is interesting to note, in this connection that of 38 forced landings on the Chicago run 28 were the result of poor visibility and 11 were caused by engine trouble. The Cleveland line had cancelled 10 scheduled trips because of bad weather, and had suffered 11 forced landings, seven being due to engine trouble and four to adverse weather. There had not been a single accident attributable to the planes on either of the lines and not a single person had been injured.

This splendid record, however was soon to be marred. On May 18 of that year Ross Kirkpatrick, who, it will be recalled, had flown the mails since the beginning, encountered a terrific storm, near Argo, and was killed.

The sixth of this series of articles by Mr. Nevill will appear in an early issue of AVIATION

GENERAL NEWS

Aeronautics Branch Gets Statistics Section

WASHINGTON (D. C.)—The Department of Commerce received 3,902 specific requests for aeronautical information during the month of July, according to the announcement of Clarence M. Young, Director of Aeronautics. A Statistics and Distribution Section of the Aeronautics Branch of the Department has been organized under the supervision of Harry H. Blee, Chief of the Division of Airports and Aeronautic Information. This will facilitate replies to the ever-increasing number of such inquiries which are being received from all parts of the United States.

A complete library of 399 volumes, an index of 149 publications and a catalog of all available aeronautical documents is maintained by this section of the Commerce Department, in addition to which it publishes bulletins on 21 different subjects of special interest to the aviation industry and to the public at large. Aeronautics bulletins available on request from the Department of Commerce include (1) Civil Aeronautics in the United States, (2) Construction of Airports, (3) Aeronautics Trade Directory, (4) Report of Airway Marking Committee, (5) Airports and Landing Fields, (6) List of all Aeronautical Publications, (7) Air Commerce Regulations, (8) Airway Map of the United States, (9) Operating Air Transport Routes in the United States, and (10) Airway Strip Maps, (11) Airway Distance Map of the United States, (12) Airway Operation Costs, (13) Civil Air Accidents and Casualties, (14) Requirements for Approved Type Certificates, (15) Air Traffic Rules, (16) Airport Rating Regulations, (17) Airports—Types of Management, Rentals, Concessions and Field Rules, (18) State Aeronautical Legislation and Abstract of State Laws, (19) Aviation Training, (20) Directory of Licensed Pilots, and (21) Notes on Airport Lighting.

Three Low-Wings Under Way

WICHITA (KAN.)—Work is progressing on three low wing monoplanes in Wichita factories. Sullivan Aircraft Company is expected to put its product in the air first. Initial test flights for the "Crested Harpy," a three-place plane with complete dual controls are scheduled for the middle of August. It will carry Kinner power. Swallow is building a low wing plane but company officials say no announcement regarding it will be made until it is ready for test flights. Mooney Aircraft Company's low-wing craft will be in the air late in August or early in September, company officials say.

Graf Zeppelin Makes Third Atlantic Crossing in 93 Hr.

Engines Work Well On 5,003-Mi. Flight

LAKEHURST (N. J.)—With its new set of engines functioning satisfactorily, except for one instance of minor trouble in one engine which was remedied in the air, the Graf Zeppelin last week made its third flight across the Atlantic, a trip chiefly marked by normality. The airship took off from its home airport at Friedrichshafen, Germany, on Wednesday, July 31, at 9 29 p.m. (eastern standard time) and arrived over this airport on Sunday, August 4 at 6 29 p.m. (eastern standard time). The airship landed more than two hours later, at 8 52 p.m.

The dirigible was in the air 95 hr. 23 min. The time from Friedrichshafen to the first arrival over the field was just 93 hr. After appearing over the air station here the dirigible flew north over New York City and did not return for the landing until after dark. The actual time of the take-off in Germany was at 3 29 a.m. German time. On its previous flight the dirigible required 111½ hr. on account of storms and damage to one stabilizer, the arrival being here, also on Oct. 15, 1928.

Arrival of the Graf at Lakehurst

The course was south down the Rhone Valley to the Mediterranean, passing over Besançon, Lyons and Nimes in France. The southern coast of Spain was skirted and the airship passed out to sea at Gibraltar. Mail was dropped while it was passing over the Azores. From there a direct course to Lakehurst was steered. During the passage down the Rhone Valley, a bad storm caused turbulent air conditions, which slowed progress and made the dirigible rock somewhat.

Twenty Passengers Carried

Favorable weather was the rule most of the way across the Atlantic but head winds were met again on nearing the coast of the United States. Dr. Hugo Eckener, commander of the craft had hoped to complete the voyage in under 80 hr.

There were twenty passengers—two women and eighteen men. The crew numbered 41 and there was a cargo of mail and light freight. Passengers and goods were turned over to the customs officers when the landing had been made. Waiting buses took them to a building reserved for these formalities.

(Concluded on Next Page)

Pitcairn Firm Now in Brooklyn

BROOKLYN (N. Y.)—Pitcairn Aviation, Inc., operating the Atlanta-New York and Atlanta-Tampa-Miami Air Mail Lines, is now located in Brooklyn, N. Y., following the recent sale of the company to North American Aviation, Inc. The new address is the Sperry Building, Manhattan Bridge Plaza, Brooklyn, N. Y. General business publicity and accounting departments are centralized at the new location with Ralph S. Westing as business manager. The telephone number is Cumberland 9700. Operations will still be directed from Richmond, where Lieut. Harold A. Elliott operations manager maintains his office at Richard E. Byrd Field.

C.A.L. Buys Hornet Stearmans

LOUISVILLE (KY.)—Purchase of three combination mail and passenger planes by Continental Air Lines, Inc., for the firm's Cleveland-Louisville route is announced here. The craft are Pratt & Whitney Hornet powered Stearmans.

Endurance Flight Record is 420 Hr.

Refuelings Total 48, All Contacts Number 77

ST LOUIS (MO)—After a sustained flight of 420 hr 21 min and 30 sec. the record-breaking monoplane "St Louis Robin," piloted by Dale Jackson and Forest O'Brine, was landed at Lambert-St Louis Field at 7:38 p m on July 30 This broke the previous refueling endurance record by 173 hr 37 min It is estimated that the plane had been flown 25,200 mi It used 3,590 gal of "Naturaline" gasoline and 158 gal of "Gulfpride" oil The refueling plane made 77 contacts of which 48 were completed for the transfer of gasoline

The engine was still functioning perfectly when the flight ended in compliance with the request of Maj William B Robertson president of the Curtiss Robertson Airplane Manufacturing Company sponsor of the flight. Both plane and engine will be carefully checked the engine at the Buffalo plant of the Curtiss Aeroplane & Motor Company and a detailed report will be made later on this data

Companies Contribute

Prize money known to be due to the fliers was $31 225, and this is believed to have been increased by subsequent gifts and others not included in the first figure Among the contributors were The B F Goodrich Rubber Company Stromberg Motor Devices, Inc, Shgo Iron Company and The Electric Storage Battery Company makers of "Exide" batteries, all of whom supplied parts used in the record-breaking plane Among the gifts by other firms were $800 the receipts from one day's air sight-seeing business by Universal Aviation Corporation and $65 from the sight-seeing business receipts of Von Hoffman Aircraft Company Of course, the major part of the total came from Curtiss Aeroplane & Motor Company Inc whose directors voted the fliers $25 400 an amount equivalent to $100 for each hour added to the record up to a 500 hr total This action was taken because of the fact that the pilots did not land of their own accord

Fliers Now on Trip

It is interesting to note that on July 30 the day the flight ended, the 500th plane was finished at the factory of the Curtiss-Robertson Airplane Manufacturing Company This was the production total for 51 weeks after the completion of the first St Louis-built Robin

Jackson and O'Brine left Lambert-St Louis Field the morning of Aug 2 for Chicago the first of 13 cities they will visit to demonstrate refueling in flight. They flew the St Louis Robin equipped with a new Curtiss "Challenger" engine The tour covers cities in which Curtiss Flying Service units are established The itinerary was scheduled as follows: Kansas City Mo Aug 3 and 4 Memphis, Tenn Aug 5 and 6 Nashville Tenn, Aug 7 (noon) Louisville Ky Aug 7 and 8, Columbus Ohio, Aug 9 Indianapolis, Ind, Aug 10 and 11, Moline Ill Aug 12 and 13 Detroit Mich, Aug 14 and 15 Toledo, Ohio, Aug 16 Buffalo N Y Aug 17 Syracuse N Y Aug 18 (noon), Valley Stream, L I Aug 18 The refueling plane, with Maj C Ray Wassall and P V Chaffee as pilots will accompany the record-holders on the tour.

Safe Aircraft Contest to Close

NEW YORK (N Y)—Closing date for entries in the Daniel Guggenheim Safe Aircraft Competition will be Sept 1 according to a decision of the Daniel Guggenheim Fund, while the closing date of the Competition itself will be Oct 31, 1929 Any application for entry in the Competition mailed on or before Sept 1 will be given the same consideration as the sixteen accepted entries

Record Robin Was Insured

NEW YORK (N Y)—Through a policy issued by Associated Aviation Underwriters, this city, insurance for the duration of the flight against fire, damage by accident, and other hazards was carried for both the Challenger-powered Curtiss Robin "St Louis Robin," flown to a new refueling endurance record of more than 420 hr by Dale Jackson and Forest O'Brine, and for the refueling plane The St Louis Robin" was completely "covered" the policy including $6 000 on the plane, property damage up to $5 000 and public liability protection of $30 000 Associated Aviation Underwriters was formed some months ago by the Marine Office of America and Messrs Chubb & Son and represents such companies as the Continental, London Assurance, Fidelity Phenix, Federal Glens Falls Alliance Assurance, and American Eagle

New Axelson Plant Under Way

LOS ANGELES (CALIF)—Concrete for the foundations and floors of the new Axelson engine factory has been poured and contracts for the steel framework have been awarded to Consolidated Steel Corporation this city, according to announcement of Axelson officials It is said that $200,000 worth of machinery will be installed by Sept 15 Present production of Axelson engines is being conducted in the main plant of Axelson Machine Company

Graf Zeppelin Crosses Atlantic in 93 Hr.

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and the procedure was the same as for the passengers of a steamship

Dr Eckener gave the average speed for the 5,003 nautical miles of the course as about 55 nautical m p h He said that the coast-to coast time was 67 hr 30 min That would be from Gibraltar to Barnegat Bay This figure was given in answer to comparisons of the record of 113 hr 22 min of the Bremen on its recent record-breaking west-east trip representing a coast-to-coast trip He said 2 300 c m of Blau gas, the only fuel used on the trip, were consumed

One of the important indications of the degree of success of the flight is contained in the reactions of the passengers All reported themselves delighted with the experience, declaring that the trip had been very comfortable and devoid of anything to arouse anxiety Even in the storm periods they reported, the motion of the dirigible was not annoying Several sought passage on the return flight They were taken to New York City by special train under auspices of the Hamburg-American Line, agents for the Zeppelin interests

The Graf Zeppelin was described fully in AVIATION for October 20, 1928. Its general specifications are Over-all length 778 ft maximum diameter 100 ft maximum height 110 ft total weight 121 tons gross lift 107 tons designed pay load 15 tons cruising speed about 72 m p h. Five Maybach-Zeppelin VL-2 engines are used They are of twelve cylinders each and are water cooled each engine developing 600 hp at sea level, or about 550 hp at the altitude of Friedrichshafen

This trip to the United States was in the nature of a dress rehearsal for the long planned flight around the world Lakehurst will be the start and finish for this flight Preparations were begun at once to groom the airship for the trip (As AVIATION goes to press it is hoped that everything will be in readiness to start for Germany on the first leg of the world flight on Wednesday Aug 7.)

Record Flight Brings Orders

ST LOUIS (MO)—Orders for 50 Challenger-powered Curtiss Robin cabin planes similar to the refueling endurance record breaker, St Louis Robin" have been received since the close of the long duration flight Total cash value of this business is put at $375 000

To Produce Radios for Planes

CHICAGO (ILL.)—Aircraft Radio Corporation, newly organized in Chicago, will go into the production of radio sets for planes Fred W Stein has designed a set for aircraft that is said to be extremely light and compact

Flies Tri-Engined Bach To Altitude of 20,000 Ft.

LOS ANGELES (CALIF)—An altitude record for tri-engined commercial planes was set above the Los Angeles Metropolitan Airport on July 26 when Waldo D Waterman piloted a standard Bach transport monoplane to an unofficial altitude of 20 000 ft. with a load of 2 200 lb of sand in the passenger cabin.

The attempt was observed by Joe Nikrent, official timer for the Los Angeles chapter of the National Aeronautic Association, and the sealed barograph carried in the plane was dispatched to Washington for calibration

Waterman carried oxygen equipment which he used above 18 000 ft The climb to 18 000 ft was made in 40 min and to 20 000 ft in approximately 1½ hr. Temperature varied from 85 deg at the ground to 35 deg above zero at 20 000 ft

The Bach plane used on this test is of standard ten-place type and is powered with one Pratt and Whitney 525-hp Hornet in the nose and one Wright Whirlwind 150-hp. engine under each wing, giving a total of 825 hp This plane has now been sent to the Eastern territory, where it will be demonstrated over the established airlines in competition with other tri-engined planes now in use

Coastal Goes With Airvia

NEW YORK (N Y)—Coastal Airways, operating a passenger service from New York to Albany and New York to Saratoga, will be merged with Airvia Transportation Company, Inc, which operates a seaplane service between New York and Boston, with two Savoia-Marchetti twelve passenger flying boats, according to the announcement of Pres E A D'Angelus of the former company Both companies will maintain their present routes Airvia will increase its Class A stock from 200 000 to 400 000 shares, exchanging one share for each two of Coastal Airways stock Class B stock of Airvia will remain at 100 000 shares A coastal air service from Buenos Aires to Montreal, with services extended to Havana Cuba, this fall and to Brazil and the Argentine early next year is planned by the new company, according to the announcement

Cirrus Workers to Be Pilots

BELLEVILLE (N J)—American Cirrus Engines Inc, has opened an airport at Pine Brook, N. J., to provide instruction in flying for workers in the Cirrus factory It is the belief of officers of the company that the men who make engines should learn from actual experience the dependence which the airman is compelled to place upon his engine, and that by this means the manufacturing force will be instilled with an unusual spirit of caution and precision The school is in charge of Capt William N Lancaster

Italian Firm to Build Hamiltons

MILWAUKEE (WIS.)—Trans-Asiatica Company, Rome, Italy, has completed a contract with Hamilton Metalplane Company, United Aircraft & Transport subsidiary this city whereby the present Hamilton planes will be built by the Italian firm Trans-Asiatica is now using one of these planes in passenger service

Parks Will Establish Seven Branch Schools

ST LOUIS (MO)—An expansion program calling for the opening of branch schools at seven points in the country in addition to the central school at Parks Airport is announced by Harry P Mamen, president of Parks Air College

Preparations are being made for the opening of schools in Central Texas, New Jersey, Northern Ohio, Southern California and a small town near Boston, Mass It also is planned to open a school in the Northwest, probably near Seattle, Wash. In each case the schools will be located on privately owned fields.

To finance the opening of chain schools, stockholders have authorized the issuance of a new issue of 400 000 shares of stock to sell at the subscription price of $14 50 a share The stock is to be listed on the St Louis Stock Exchange and the New York Curb For each of the branch schools, local capital will be invited to participate to the extent of owning 49 per cent of the stock. The controlling interest will be held by Parks Air College, whose present instruction policies will prevail

Beadix Reports Earnings

CHICAGO (ILL.)—Net earnings for the six months ended June 30 at $5,165,967 82 after all charges including taxes is reported by Bendix Aviation Corporation These earnings equal to $2 57 per share on the 2 015 000 shares net outstanding do not include those of Pioneer Instrument Company, which was acquired in the latter part of June

United Aircraft Acquires Stearman

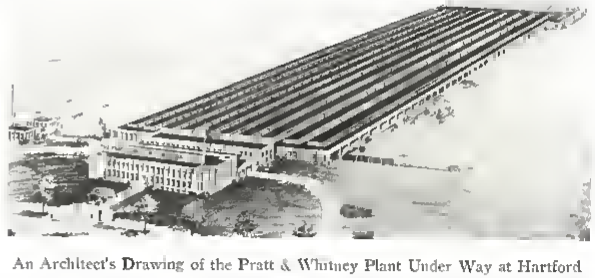
Adds Smaller Commercial Craft to Holding Firm Line

NEW YORK (N Y)—United Aircraft & Transport Corporation announces acquisition of Stearman Aircraft Company, of Wichita, Kan, the latter firm to be operated hereafter as a unit of the United group. A block of 26 667 shares of United common stock will be issued to exchange for the 100 000 shares of Stearman common, on a basis of 100 for 375 Lloyd Stearman president of Stearman Aircraft Company, and his chief engineer Mac Short, will continue to manage the factory No change in personnel is contemplated at the present time

Mr Rentschler, president of United Aircraft & Transport Corporation, in commenting upon the merger said that United was interested primarily in obtaining within its group an outstanding designer and manufacturer of strictly commercial smaller type aircraft. Mr Stearman, who made an announcement on behalf of his company at the same time, stated his strong conviction that the best future for aeronautics lies in the amalgamation of engineering, manufacturing and financial resources of various units He said, "The surest path to progress lies, in our belief, in pooling the various technical, manufacturing and financial concerns which have proven themselves paramount in their own fields so that the talents of all may be utilized in a community of interest For that reason we have decided to combine with United Aircraft & Transport"

The Stearman company, which was founded in 1927, is concentrating its efforts on the manufacture of two sizes of open and closed planes, both purely commercial The company has orders on its books at present which will require production at full capacity for three months, it is stated

New Home of Wasp and Hornet Engines



An Architect's Drawing of the Pratt & Whitney Plant Under Way at Hartford

Many Chamber Meetings at Races

Gathering of Sections Scheduled Aug 26-Sept. 2

CLEVELAND (OHIO)—Leaders of the aircraft industry from all parts of the country will discuss economic problems at the meetings of the Aeronautical Chamber of Commerce of America in Cleveland from Aug 26 to Sept 2 Special conferences will be held for airplane manufacturers, engine manufacturers, accessory and equipment manufacturers, flying school operators, fuel and lubricant manufacturers air transport operators, and distributors and dealers in aircraft

Technical problems of the industry relations with the Government, and the adjustment of aircraft production to demand will be discussed during the first four days of industrial meetings On the fifth day Sept 2 commercial airplane manufacturers will meet with officials of the Department of Commerce to consider possible changes in the Airworthiness Requirements set up by the Government for the guidance of manufacturers the adoption of a code of procedure for the discussion of aircraft industrial problems which concern the Government and means for accelerating the testing of engines by the Government for approved type certificates

Accessory Men to Meet

Sixty industries contributing accessories or equipment in the manufacture of aircraft will be represented at a special meeting of Accessory and Material Manufacturers, who will complete the organization of a section in the Aeronautical Chamber of Commerce devoted to their interests

The need for standardized specifications in the accessory and equipment field will be considered at the conference, and the basis for standardization set up The program to be developed at these conferences is expected to meet the needs of the airplane and engine manufacturers Any plan developed will be submitted to the Committee on Standards, which considers the suggestions of all concerned with specifications for accessories and materials

To Discuss Discounts

Plans for standardizing the fueling equipment for planes at all airports and the setting up of an agency to approve fuels and lubricants by name rather than by specification will be considered by the manufacturers of fuels and lubricants at their meeting, Wednesday morning, Aug 28 Committees representing the fuel and lubricant interests will meet with the aircraft engine manufacturers Monday morning, Aug 26 and with the air transport operators Tuesday morning, Aug 27 Their reports will be considered at the Aug 28 meeting.

Uniform discounts by the engine manufacturers to the aircraft manufacturers and by the airplane builders to the distributors and dealers are among the basic problems to be discussed during the series of industrial meetings

The aircraft engine manufacturers and distributors and dealers will meet concurrently Tuesday morning Aug 27 The aircraft and engine builders will have a joint meeting Wednesday morning Aug 28

Questionable advertising by incompetent flying schools is due for consideration by the flying school committee recently appointed by Frederick B Rentschler president of the Aeronautical Chamber of Commerce It will be the first meeting of the new committee and a permanent chairman will be elected

The problems concerned with the financing of planes on time payment plans and the insuring of planes passengers and pilots will be considered by the finance insurance section of the Aeronautical Chamber of Commerce at its meeting Thursday morning Aug 29

The complete program of aircraft industrial meetings follows

Aug 26—Commercial Airplane Manufacturers Section 9 a.m. to 1 p.m. Accessory and Material Manufacturers Section 9 a.m to 1 p.m Joint Conference 1 Fuel and Lubricants Committee with Aircraft Engine Manufacturers Section 10 00 a.m

Aug 27—Engine Manufacturers Section 9 a.m to 1 p.m Distributors and Dealers Section 9 a.m. to 1 p.m Joint Conference Fuel and Lubricants Committee with Air Transport Operators, 10 00 a.m

Aug 28—Joint Committee Meeting Commercial Airplane Manufacturers Section with Engine Manufacturers Section 9 a.m to 1 p.m Fuel and Lubricants Section, 9 a.m to 1 p.m

Aug 29—Flying School Committee 9 a.m to 1 p.m. Finance-Insurance Section, 9 a.m to 1 p.m

Sept 2—Joint Conference of Department of Commerce with Commercial Airplane Manufacturers 9 a.m

Aero License Statistics Issued

WASHINGTON (D C)—The Department of Commerce, in the three years since the Aeronautics Branch was established has licensed 4 742 aircraft, which are still in use 6 533 airplane pilots, and 6 085 aviation mechanics It has also identified 3,013 planes, issued 183 export certificates and approved 26 types of aircraft engines and 178 kinds of airplanes To date, the Department has received more than 65 000 applications and renewal requests for its different types of licenses That this number seems destined to increase even more rapidly during the next twelve months is indicated by the fact that there are now 575 aviation schools in the United States and 1 950 business concerns engaged in the aeronautic industry

Fokker Reports on Quarter

NEW YORK (N Y)—Fokker Aircraft Corporation reports a net of $357,427 for the second quarter of 1929 equal to about $0 50 per share on 601 966 common shares the average number outstanding during the period This compares with $139 984 in the first quarter

Fifteen Planes Finish "All Georgia Air Tour"

ATLANTA (GA.)—The first "All-Georgia Air Tour," pronounced successful by its sponsors, ended here July 26th with the landing of the fifteen tour planes at Candler Field

During the four days the "Aerocade" visited 21 cities and towns, scattered throughout the state, circled almost as many more and travelled a total of 1 125 mi The official time for the tour was 14 hr 13 min, indicating an average cruising speed of 80 m.p.h. for the fifteen-plane squadron.

The tour, sponsored by the Atlanta *Constitution* was conducted under full sanction of the National Aeronautic Association, Maj Luke Christopher secretary of the N A A Contest Committee, serving as squadron commander

More than 150 000 airminded citizens were on hand to receive the "air visitors" at the twenty one ports of call. The arrival and departure of the planes was executed on schedule in every instance except at Savannah where "Miss Cedartown" struck a stump while taking-off from an emergency landing field. The pilot was uninjured and damage to the plane was slight

Col Henderson Hallman, N A A Governor for Georgia announced immediately after the tour that new chapters were being formed at Gainesville McRae, Valdosta and Cedartown and that several cities had applied for membership as a result of interest created The tour will become an annual event and is expected to follow a much more extensive itinerary in 1930

The planes departed from Candler Field here July 23 at 7 a.m., visiting Macon La Grange Columbus Americus and arrived at Albany at 4 26 p.m (first night control) Second day—departed from Albany at 8 a.m visiting Pelham Thomasville Valdosta Douglas, Waycross Savannah, and arrived at Brunswick at 4 07 p.m. (second night control) Third day—departed from Brunswick at 7 a.m visiting McRae Louisville Waynesboro Augusta Athens Jefferson and arrived at Gainesville at 5 04 p.m (third night control) Fourth and last day—departed from Gainesville at 10 15 a.m visiting Lawrenceville, Canton Rome, Cedartown, and arrived at Candler Field at 3 27 p.m. At McRae and Pelham, new airports were dedicated

Official entries were "Miss Georgia" Ryan B1 Beeler Blevins "Miss Atlanta" Stinson Detroiter Paul Foster Jr "City of Athens" Waco 10 Mack Johnson "Spirit of Brunswick" Waco 10, E W Hightower, Jr "Miss Cedartown" Travel Air 2000" Charles Adamson Jr "Queen of the Mountains" entered by Gainesville Chamber of Commerce Curtiss Robin challenger engine, George A Sheals "Miss Rome," Travel Air "2000" Robert C Stroop "Miss Savannah" Waco 10 Hugh I DuBose "Miss Constitution" (official press plane) Travel Air J 6 monoplane Douglas Davis N A A, A-3 Curtiss Falcon (courtesy U S Army Air Corps) Capt A E McDaniel Fox Movietone Flying Unit No 1 Fokker Super-Universal Capt Will C Seivert Interstate Air Lines, Stearman C3B Earl F Ward Pitcairn Aviation Inc Pitcairn Super-Mailwing J Ben Faulkner Waco Aircraft Company Waco "220" Freddie Lund Southern Aircraft Corporation Air Boss Glenn E Messer

Stearman Stock to Employees

WICHITA (KAN)—Stearman Aircraft Company employees have been given the chance to purchase treasury stock of the company at $28 per share

San Diego Schedules Glider Meet Next Month

SAN DIEGO (CALIF.)—Under the auspices of the Pacific Coast Beach Business Men's Association and the San Diego Glider Club, the Pacific Coast Glider Meet is scheduled here at Pacific Beach, Sept 1 2 The meet is sanctioned by the San Diego Chapter of the N A A and is supervised by the San Diego Board of Air Control, the Aviation Committee of the San Diego Chamber of Commerce is arranging and handling the activity.

The competition will be for duration without return to the point of departure for distance air line for altitude above the starting point and for landing on a mark Events will start at noon Sept 1 All entries must be received before this time Prizes will be offered

Gliders will be divided into three classes, namely primary training, secondary training, and soarers but each event will be open to craft of all classes the classifications being made for purpose of claiming American records in each class, should excellent flights be made All launching will be by shock cord method from the side of a hill

The engineless craft are to be placed on exhibit at Crystal Pier, Pacific Beach on Saturday afternoon and evening, Aug 31 Entries should be mailed to D W Campbell, Chamber of Commerce, San Diego

Endorse Cadmium as Resistant

SEATTLE (WASH)—Cadmium is one of the best resistants to corrosion according to a decision of Boeing Airplane engineers A test part plated with cadmium was placed in a salt spray bath and left for 1 000 hr at the conclusion of which there is said to have been no trace of corrosion The plating department of the firm is equipped with tanks filled with the cadmium solution The parts are immersed in the solution which is then electrolized by current supplied from a special generator

United Reports Quarterly Net

NEW YORK (N Y)—United Aircraft & Transport Corporation net income for three months ended June 30 1929 was reported as $2 650 000 after all charges including Federal taxes had been deducted. In addition to paying dividends on the preferred stock this gave $1 57 for each of the 1,570,248 shares of common stock This compares with a net income of $1 803 000 for the first three months of this year

Mexican Line Orders Six Ryans

ST LOUIS (MO)—Ryan Aircraft corporation, subsidiary of Detroit Aircraft Corporation, has received an order for six Broughams for immediate delivery The planes will be used on the air mail and passenger route between Tia Juana and Mexico City by the Compania de Transportes Aeros Latino Americana

Chutes for Garland Students

TULSA (OKLA.)—Parachutes will be used in all training hereafter at the Garland School of Aeronautics this city An order for eight Irving chutes has been placed Both students and instructors will be required to wear parachutes, and in addition the school ground training will include a course in the care and use of the chute Jumps by students will be optional.

Approval Certificates To Ten More Airplanes

WASHINGTON (D C)—Ten more approved type certificates for airplanes were issued here by the Aeronautics Branch during the week ending Aug 3 The approvals, according to number model, type, power plant, useful load and gross weight, are as follows

No 181—Lincoln PT, two-place open biplane OX 5 540 lb 1 968 lb, No 182—Curtiss Fledgling Jr two-place open biplane Challenger, 671 lb 2 592 lb, No 183—Boeing 40-B4 five place cabin biplane Hornet 2 271 lb., 6 080 lb No 184—Command-Aire 5-C 3 three-place open biplane, Challenger 878 lb 2 360 lb, No 185—Command Aire 5-C-3A three place open biplane 150 hp Hisso 913 lb 2,523 lb No 186—Swallow TP-K two-place biplane Kinner 530 lb, 1 700 lb No 187—Stearman LT-1, five place cabin biplane, Hornet, 2 360 lb 6 250 lb, No 188—Travel Air BE 4000 three-place open biplane, Whirlwind-Five 1 007 lb 2,702 lb, No 189—Travel Air BC-4000, three place open biplane Challenger, 1 007 lb 2 800 lb No 190—Alexander A-15 three-place open biplane Kinner, 838 lb, 2 261 lb

Nine Eaglerocks Quickly Sold

ST PAUL (MINN)—Sale of nine Eaglerock planes in as many days is reported by L. D Chandler of Minnesota Aircraft Company, sales subsidiary of Great Northern Aviation Corporation The planes all powered with Kinner or Hisso engines were sold to E. B Stern, of St Paul E J. Fowler and C L Krause of St James Minn H G. Brown of Minneapolis L J Sohler, of Mankato Minn, Robert Hadley of Eau Claire, Wis L W Chapman of River Falls Wis, Lieut Clinton H Sigel of Virginia, Minn L. C McClure and Francis T McCahil, both of St Paul

Air Corps Suit Order Awarded

TRENTON (N J) — Canvas Leather Specialty Company this city manufacturer of "Snappy Snug" flying clothes, announces receipt of an Army Air Corps contract for 487 Type B winter flying suits An initial Army order for 800 was completed a few months ago Besides these suits, which are made of calfskin, are lined with heavy wood felt and offer the Nutria collar and zipper fasteners the firm also makes helmets and wind cones

Chute Approvals May Be Awarded

Makers Considering Proposed Procedure

WASHINGTON (D C)—Advisability of issuing approved type certificates for parachutes is being considered by the Aeronautics Branch, it is announced here by Director Clarence M. Young The aim of such a move would be the prevention of employment in licensed aircraft of all apparatus not meeting the Government requirements and also to insure that this apparatus will be as safe as possible under all conditions

It is intended that the proposed new regulations shall apply only to individual manually operated parachutes of the type now in general use Other types which may be developed however, will be given due consideration

In keeping with the Department's established policy in all matters of this nature, a preliminary draft of suggested test procedure and requirements is now being submitted for the consideration of the parachute manufacturers

In order to obtain approval of a given type of parachute under the proposed regulations a manufacturer is to submit to the Department of Commerce complete drawings and specifications, including strength of materials and is to show that the follow-through between parachute and rider is so engineered that all parts carrying a shock load are stronger than the combined strength of the suspension lines to which they are attached

Additional requirements are expected to specify that a rip cord sealing device be provided that all metal parts be designed to carry their full rated load without yielding that the harness be constructed so as to enable the rider to release himself and drop clear in case of a water landing

Dawson to Address Welders

NEW YORK (N Y) — American Welding Society will hold its fall meetings with morning sessions at the Hotel Statler and afternoon sessions and exhibits at the Cleveland Public Auditorium Cleveland, Ohio, from Sept 10-13 J R Dawson, Research Laboratory, Union Carbide & Carbon Company will give a paper the afternoon of Sept 10 on "Welded High Strength Aluminum Alloys for the Aircraft Industry"

Stuart Aero Plant Opened

ST LOUIS (MO) — Stuart Aero Products, Inc announces the opening of their manufacturing plant in St Louis, Mo., with equipment for automatic screw machining, chucking and bar work die casting multiple drilling, stamping, deep drawing and spinning The plant is located at the corner of Thirteenth and Rutger Streets

Supreme Propeller Reports on First Year

WICHITA (KAN.)—On July 27 Supreme Propeller Company rounded out its first year in Wichita On May 31 a volume of $60 000 worth of business had been done company officials announced It also was said the company will show a 20 per cent profit on its capital investment for the first year

More than 3 000 propellers were built and delivered by the Supreme company during the past 12 months New territory is being opened rapidly according to S J Stone, assistant general manager In the past the company confined its sales to the East, but with increased production resulting from the sale to old stockholders of 2 000 shares of treasury stock a number of new agencies are being located in the western states

The new Supreme factory building costing $60 000, will be ready for occupancy on Sept 1 The factory was erected on a two-story plan with a balcony 20 ft wide forming the second story The main floor is open to the roof giving workmen plenty of light The balcony, circling the entire building will be used for a finishing department

One end of the main factory room on the ground floor will be used as an experimental department. A new steel propeller, which the company expects to have on the market by Jan 1 will be given much attention in the new plant M J Stone, secretary and general manager of the company, will have complete charge of the steel propeller experiments

Additional Cleveland Exhibitors

CLEVELAND (OHIO)—Twenty-four additional exhibitors at the National Air Races, this city, Aug 24-Sept. 2, are announced as follows: The Air-Maze Corporation, Cleveland; John A Roebling's Sons & Company, Trenton N J, Parks Air College, St Louis; Shell Petroleum Corporation of Delaware, Cleveland; Upson-Walton Company, Cleveland, Gilbert & Barker Manufacturing Company, Springfield, Mass, The National Acme Company, Cleveland; Pyrene Manufacturing Company Newark, N J; S Acceptance Corporation, Philadelphia; Allen & Drew, Inc, Cambridge, Mass, Crouse-Hinds Company, Syracuse, N Y., Arrow Aircraft & Motor Corporation, Havelock, Neb, Streloff Naughton Corporation, Long Island City, N Y.; Whitelsey Manufacturing Corporation, Bridgeport, Conn; Aeronautical Products Corporation, Los Angeles; *Aero Mechanics*, New York City Hartford Machine Screw Company Hartford, Conn., Tips & Smith, Houston Tex; Indiana Lamp Corporation, Connersville, Ind., Tidewater Oil Sales Corporation, Chicago, Pocahontas Oil Company, Cleveland Star Aircraft Company, Bartlesville Okla.; Aeronautical Safety Rating Company of America, Los Angeles, and Bourne-Fuller Company, Cleveland

Swallow T-P's "Turtle-Backed"

WICHITA (KAN.) — Fuselages of Swallow Airplane Manufacturing Company T-P training planes now are being "turtle backed" according to an announcement here These machines furthermore, are being turned out with two-tone green fuselages and yellow wings and with black fuselages and burnt orange wings the colors replacing the former olive drab finish

New Mohawk Models Tested at Minneapolis

MINNEAPOLIS (MINN.)—Two new models of low wing monoplanes produced by Mohawk Aircraft Corporation here, were given flight tests at Wold-Chamberlain Field recently in the presence of officials of the airplane company

The two planes tested were a two-place open monoplane powered with a Warner engine and a three-place cabin monoplane powered with two Rover inverted air-cooled in-line power plants Both machines were designed by John D Akerman, chief engineer of the Mohawk firm Testing was done by Charles W Holman, operations manager of Northwest Airways, and A S Koch, test pilot

The planes are understood to have performed successfully all maneuvers as required by the Department of Commerce Tests were witnessed by R R Rand Jr, chairman of the board of directors and Stanley Partridge, president. The Warner-powered open plane will be known as the 'New Pinto"

Ekko Forms Aero Division

CHICAGO (ILL.)—Intending to represent in mid-western territory a few high-grade manufacturers of aeronautical supplies and accessories, The Ekko Company, with offices in the Daily News Plaza, Chicago, has just established an aeronautical division under the direction of O McMillan formerly with Interstate Air Lines The Ekko Company has served successfully during the past eight years as representative of various radio firms, having resident salesmen located at strategic points in the northern half of Indiana, northern half of Illinois eastern half of Wisconsin, and the river towns of Iowa.

Credit Firm Reports Business

NEW YORK (N Y.)—Since April 1, Aviation Credit Corporation, this city, has financed sales of aircraft having a combined value of $609,476 86, according to a statement issued by the company Planes financed have been of various sizes, types, and makes, and have been purchased for varied operations Aviation Credit, which handles both wholesale and retail sales, at present has contracts for its service with Bellanca Aircraft Corporation, Curtiss Flying Service Metal Aircraft Company, Travel Air Manufacturing Company and Wico Aircraft Company

Army Planes to Fly At National Air Races

WASHINGTON (D. C.)—More than two score planes will take part in the National Air Races to be held at Cleveland, Aug 24 to Sept 2 A total of 45 of these planes will participate in tactical exhibition flights during the Races, comprising eighteen Attack planes from the 3rd Attack Group stationed at Fort Crockett, Galveston, Tex, eighteen Pursuit planes from the First Pursuit Group, Selfridge Field, Mt Clemens, Mich, and nine Bombardment planes from the 2nd Bombardment Group, Langley Field, Va.

The bombardment planes are the same machines which are starting from Langley Field for a rapid tactical formation flight to the Pacific Coast, present plans contemplating the return flight to be made in easy stages so as to enable the bombers to arrive at Cleveland in time to participate in the Races

Pilots from the First Pursuit Group will participate in the annual John L Mitchell Trophy Race, which event is limited to members of this organization The Attack Group pilots will compete for the Mason M Patrick Trophy, which is also an annual event, limited to members of the Third Attack Group

Arrange Fort Worth Aerocade

FORT WORTH (TEX.) — Itinerary and dates for the second annual "Fort Worth Aerocade," a combined good-will and trade aerial excursion, have been arranged The trip will be made Aug 30-Sept 2 over a 1 800-mi itinerary to Gulf Coast and Mexican Border points. Stops will be made at Corsicana, Houston, Beaumont, Galveston, Matagorda or Victoria, Corpus Christi, Brownsville Harlingen McAllen Laredo, San Antonio, Kerrville, Austin and Brady Fifteen planes and 50 passengers are expected to make the trip Last years Aerocade covered a 1,000-mi itinerary in West Texas

Goodyear Offers New Tire

AKRON (OHIO)—The Goodyear "Air Wheel," Musselman type has been announced by P W Litchfield, president of the Goodyear Tire & Rubber Company, here The new tire is revolutionary in design, being a full balloon casing mounted directly on a hub attached to the plane undercarriage, thus eliminating rim, spoke and wheel The casing has the dual function of a tire and a wheel

Anderson Awards Air Course

DETROIT (MICH.)—Harry Anderson, of Anderson Flying School, this city, announces his annual award of a flying course, John Lawlor being the winner This award is given each year to the student of Cass Technical High School making the highest average in the class of aerodynamics New offices of the flying school have been opened in the David Stott Building

Static Tests Conducted On Great Lakes Trainer

CLEVELAND (OHIO) — Static tests were conducted recently by the Great Lakes Aircraft Corporation here on the horizontal and vertical tail surfaces of the model 21-1 Trainer, a two place Cirrus powered training plane

Loading was accomplished by using sand bags providing 2½ lb increment Surfaces were checked with at least 25 per cent increase in load for signs of failure and reading of deflection The tests were witnessed by representatives of the Department of Commerce as well as engineers of the Great Lakes company

The stabilizer was loaded to 844 lb or 150 per cent of the design load with no failure. The elevator was loaded to 445 lb or 5 lb less than 200 per cent of the design load At the application of the last two bags failure occurred on one side, causing the fuselage to roll The weight on the right hand elevator shifted to the edge causing failure A load of 150 lb or 125 per cent of the design load was applied to the fin without failure The rudder was loaded to 140 lb or 125 per cent of design load At a point immediately beyond failure occurred The failure consisted of buckling of all members at a point near the hinges There was no failure of rudder horns nor any elongation of bolt holes

Kinner Engine Demand High

LOS ANGELES (CALIF.)—Unfilled orders to the amount of $2,000 000 are held by the Kinner Airplane & Motor Corporation, according to Robert Porter, chairman of the board Twenty five different aircraft manufacturers now have orders filed with the Kinner Corporation, it is stated Tests are now being conducted in Detroit on a tri engined cabin monoplane built by the Hise Aircraft Company and powered with three Kinner engines The Kinner firm reports it is now producing eight engines daily by working two full shifts

Akers Controls Seenrity Firm

WICHITA (KAN.)—J E Akers, recently with Braley School of Flying here has purchased controlling interest in Aeronautical Securities Corporation of Wichita This concern was organized several months ago by J H Turner and W B Harrison to handle a number of issues of aeronautical stocks These men will continue as officers of the firm Future activities of the corporation, according to Mr Akers, will center in the buying, selling and promotion of aeronautical stocks

Wisconsin Fair Show Aug. 26-31

MILWAUKEE (WIS.) — The aircraft exhibit at the Wisconsin State Fair, staged as a new feature for the first time last year, will again be held at the coming exposition, Aug 26-31

To Teach Aero Medicine

HARTFORD (CONN.)—Capt Wilham B Smith, flight surgeon of the Connecticut State Department of Aeronautics, announces that an aviation medical course will be opened here Aug 18 Doctors only will qualify as students at the course which is designed to give a thorough knowledge of aeronautical physical examination practice and of the physical reactions relevant to flying

Four Air Corps Men Granted Flying Crosses

WASHINGTON (D. C.)—Announcement is made here of award of Distinguished Flying Crosses to Lieuts James H Doolittle Harry A Sutton John P Richter and Capt Lowell H Smith Lieutenant Doolittle also received the Oak-Leaf Cluster He is honored for a one-stop flight from Pablo Beach Fla to San Diego Calif in 1922—a fine achievement with equipment available at that time. The Oak-Leaf Cluster was awarded for flights at McCook Field in 1924 in which data on acceleration in various maneuvers was accumulated in flights with a PW-7 pursuit plane

Lieutenant Sutton is honored for piloting an O-2 in 1926 in tests to determine the spinning characteristics of this machine valuable design data being gained therefrom

Captain Smith known for his participation in the Army Around-the-World flight and Lieutenant Richter were awarded the crosses for pioneering work in mid-air refueling in 1923 They flew a Liberty-powered DH4B more than 37 hr in this test

Brukner Retains Waco Control

NEW YORK (N Y.)—Clarification of the relationship between The Aviation Corporation holding firm with offices in this city and Waco Aircraft Company, Troy Ohio, is contained in advices received here. It is pointed out that a substantial minority block of Waco stock has been acquired by the former organization and that Talbot O Freeman a vice-president of Fairchild Aviation Corporation, subsidiary of The Aviation Corporation, is a member of the Waco board of directors Control of Waco however, remains in the hands of President C J Brukner

Curtiss Orders Many Moths

LOWELL (MASS.)—Signing a contract involving more than a quarter million Curtiss Flying Service which will represent Moth Aircraft Corporation, will take three Moth planes a week until Jan 1 according to Capt. A B Johnston, Moth sales manager Of this order, some seven have already been delivered with the first eighteen scheduled for use as demonstrators Six planes have been turned out here each week, but now the production schedule is being stepped up to nine per week

Expansion of Braley School Now Under Way

WICHITA (KAN.)—Capital stock of Braley School of Flying has been increased from 750 000 shares to 150,000 shares the new issue being offered to the public at $5 a share Expansion needs to take care of the school's business made the move toward additional financing imperative according to school officials Among new buildings planned is a large hangar A three-story dormitory providing lodging and entertainment facilities for the students has just been completed More than 300 students are enrolled in the Braley school according to J V C Gregory, general manager

F E Crumplar formerly with Central Air Lines here is the new sales manager of the Braley school. He holds a transport license was a member of the Lafayette Escadrille, and entered World War service with the Canadian Royal Air Squadron in 1916

A G Schlegel of Defiance Ohio formerly with Spartan Aircraft Company at Tulsa is now chief of maintenance

R E Capen of Mattoon Ill lately with Southwest Air Fast Express, of Tulsa now is in charge of planes in the flying line of the Braley school Richard Oglesby of Memphis Tenn recently with McSweeney's auto and aviation school at Cincinnati, also has joined the Braley force

Greet Granados

COL. MIGUEL GARCIA GRANADOS landed his Ryan plane at Bolling Field, Washington, July 31 having flown from Guatemala bearing a good-will message from President Chacon, of that country, to President Hoover Colonel Granados, who is chief of the Guatemalan air service, is shown here being welcomed by Assistant Secretary of War Trubee Davison Dr Adrian Recinos, minister from the Central American country, stands at the right

BRIEFLY

Weekly service between New Orleans and Grande Isle, at the mouth of the Mississippi River, is now being maintained by the Southern Air Transport branch at New Orleans.

Gross revenues of the Fairfax Airport at Kansas City from October 1, 1928, to July 1, 1929, were $122,200.

Two French Dewoitine all-metal planes, a pursuit plane and six place transport, are to be brought to the Cleveland exposition in conjunction with the National Air Races, Emil Dewoitine, airplane manufacturer of Toulouse, France, has announced.

More than a mile of cable to handle light and power lines has been laid underground and 51 pairs of telephone cables have been installed at the Cleveland Airport for the National Air Races, according to Clifford Henderson, managing director.

A large tract of land adjoining the Grand Central Air Terminal property at Glendale, Calif., and owned by the Grand Central Air Terminal, Ltd., has been thrown open to development as an aviation industrial center. Sites are either being sold or leased to manufacturers or aircraft distributors who wish to be located on the airport.

The Jacksonville (Fla.) motor club has installed a department of air travel information.

Formation of the "Canard Club" has been announced in Los Angeles, the members of which have contracted to purchase a "Canard" type glider designed by Joseph Blondin. It is believed that this will be the first modern glider to be operated in this country following the tail first principle.

Harold P. Ayres, pilot for a prominent Montreal manufacturer, recently found himself in a tight place and landed in a hay field with his Bellanca seaplane. It was reported by the Bellanca company that not the slightest damage could be found to any part of the seaplane, floats or rigging.

Chance Vought is understood to be planning a large plane factory adjacent to the new Pratt & Whitney plant at Hartford, Conn.

Minneapolis offices of Aviation Service and Transport, Inc., of Chicago, have been opened at 606 Plymouth Building. J. F. Campbell is in charge. Removal of the school sales and ticket office of Universal Aviation Corporation from 829 Marquette Avenue to 1013 Fourth Avenue South, Minneapolis, has been completed.

Manufacture of the Gee Bee plane at Fisk Park Airport, Springfield, Mass., is under way.

Quantity production of Roam Air planes is planned for the near future in a factory building now nearing completion at the Los Angeles Metropolitan Airport, Van Nuys, according to company officials. These planes were designed by Earl Ovington, Santa Barbara aviator and capitalist, with the co-operation of William J. Waterhouse, consulting engineer. Two models are to be placed in production, the Roam Air Sportster, a three place biplane and the Roam Air Cadet, a two place trainer biplane.

H. J. McNally, assistant general traffic manager for Universal Air Lines, has opened a western traffic office at 922 Union Bank Building, Los Angeles.

The Army plane "Question Mark" is to go to a new home. The plane in the very near future will be brought to Maxwell Field, at Montgomery, Ala., where it will be used in routine work.

More than 4,000 passengers were carried on sightseeing trips by Universal in the 17½ day period of O'Brine and Jackson's refueling endurance flight. On Sundays patronage ranged from 500 to 900 passengers.

The Copper State Airways, of this city, has been asked by the Western Air Express to act as a "feeder line" to its Kansas City-Los Angeles line.

The new base for the Third Attack Group at Shreveport, La., is to be named in memory of Lieut. Eugene H. Barksdale, McCook Field test pilot, who was killed while testing spinning characteristics of a new type plane.

A complete photograph of Long Island recently was made from an altitude of 20,000 ft. by Robert A. Smith, of Fairchild Aerial Surveys.

A daily commuting service between Pittsburgh and Washington is to be started soon by Aerial Rapid Transit, Inc., of the former city, it has been announced.

The First Annual Central States Aircraft Exposition is being held at Mid-West Airports, Aurora, Ill., closing August 16.

Paul Goldsborough, vice-president in charge of operations of the Universal Aviation Corporation, has moved his office from the Lambert-St. Louis Flying Field to Universal's executive offices in the Boatmen's Bank Building, St. Louis, Mo.

The Maintenance and Overhauling Department, Universal Aviation Corporation, at Lambert-St. Louis Field, has received special tools required for overhauling the new series of Wright J-6 engines.

Recent heavy travel on the regular passenger service between Chicago and Detroit and Detroit and Cleveland by the Stout Air Services, Inc., occasionally has made it necessary to use double "sections" on those runs.

The Omaha (Neb.) Auto Club is establishing an air travel service bureau.

The temporary airport at Lulu Island, Vancouver, B. C., reports greatly increasing volume of activities.

Twenty-four hour service is now in operation at the government airways radio station at Lambert-St. Louis Field and at Fort Crook Airport, Omaha, Neb.

The Mid-West Airways Des Moines-Waterloo express has been discontinued, it is announced.

PERSONNEL

ROBER Q. WILLIAMS and CAPT. LEWIS A. YANCEY, president and vice-president respectively of the Airvia Transportation Company, have resigned.

FRANK H. RUSSELL, Garden City, L. I., president CHANCE VOUGHT, New York City; J. DON ALEXANDER, Colorado Springs; WALTER C. DAVIS, Richmond, Ind.; E. J. EVANS, Detroit; HARRIS M. HANSHUE and LLOYD STEARMAN, have been elected to the board of directors of the Manufacturers' Aircraft Association.

MAURICE B. GALLAHER, of C. D. Robins & Company, and F. DON WILLIAMS, engineer and former Canadian pilot, have been named directors of the Dayton Airplane Engine Company. Mr. Williams also will serve as assistant to R. R. Grant, president and chief engineer of the company.

JOHN A. COLLINS, formerly eastern division superintendent of T.A.T. located at Port Columbus, Ohio, has been appointed superintendent of the western division. MAX CORNWALL, former western division superintendent, has been placed in charge of the engine repair and testing of the company.

THOMAS SCOTT, recent graduate of the Pioneer Airways Flying School at Omaha, Neb., has been made superintendent of the company's airport.

V. K. RAFFIJE has been appointed regional zone manager of the Fairchild Aviation of Chicago. He has been sales representative for Fairchild in New York, New England, and Pennsylvania. R. H. LASCHE, formerly with the Weeks Aircraft Corporation, Milwaukee, Wis., and later with the Fairchild Airplane Corporation at Farmingdale, L. I., will be his assistant. R. W. PEARS has been transferred to the Chicago office to the factory at Farmingdale, continuing his work as air transport contact representative.

HARRY I. DAY has been appointed district sales manager at Roosevelt Field, N. Y., for Arrow Sport Planes. His territory includes West Virginia, Virginia, Pennsylvania, New York, New Jersey, Maryland and New England. ROY MORRIS of Topeka, Kan., has been appointed district sales manager for the states of Kansas, Missouri, Oklahoma, New Mexico, Arkansas, Louisiana and Texas, while JOSEPH LEWIS, of Clover Field, Santa Monica, Calif., will be district sales manager on the West Coast.

HENRY P. LEWIS has been appointed a member of the committee of aviation advisers to George A. Parker, registrar of motor vehicles for the state.

HAROLD OLSON, representative of Universal Aviation Schools in Minneapolis, Minn., has been named assistant manager of the St. Paul office.

L. O. KENNEDY has been appointed district traffic manager of Universal Air Lines in Los Angeles, Calif., with jurisdiction over the entire Pacific Coast

(Continued on next page)

Personnel

(Continued from preceding page)

west of Denver. JOHN LARGEY, formerly with Motor Transit Company of that city, and T. C. JAMES, formerly with the Security First National Bank of Long Beach, have been appointed as assistants to Mr. Kennedy in the office which was recently opened.

E. G. RHENSTROM has been promoted to the position of chief of the technical staff in charge of all flying operations of the various divisions of Southern Air Transport, Inc., at Fort Worth, Tex. ROBERT H. GRAY, formerly assistant to the general manager, has been appointed to the post of operations manager which was held by Mr. Rhenstrom.

O. M. BOUNDS will succeed Cloyd Clevenger, who recently resigned as chief instructor and officer in the Garland Aircraft Company and the Garland-Clevenger School of Aeronautics at Tulsa, Okla. Mr. Bounds is general manager of the Garland aeronautics interests.

GEORGE MEYERS, veteran air mail pilot and past president of the National Pilots Association, has taken up his duties as chief of the flying service of the Boeing School of Aeronautics at Oakland, Calif.

MERION C. COOPER has resigned from the staff of Famous Players at Jacksonville, Fla., to become vice president of Federal Aviation, Inc., of New York, N. Y.

VERNON HUFF has been appointed assistant sales manager of the aeronautical supply and parts department of the Universal Aviation Corporation, of St. Louis, Mo.

JAMES G. HATZELL has resigned his position as chief instructor of the Spartan School of Flying, Tulsa, Okla.

DONALD McCLURE has been elected president of the board of directors of Western Aviation, Inc., of San Francisco, Calif. LAWRENCE C. AMES was elected secretary and E. O. EDGERTON and NORMAN POTTER were elected to serve on the board.

EDGAR L. FLIPPEN has been elected president of the Dallas Airports Utilities Corporation, Dallas, Tex. J. FRED SCHOELLKOPF and FRED F. FLORENCE, were elected vice-presidents, C. W. DAVIS, secretary-treasurer, and ROLAND A. LAIRD, aviation secretary of the Dallas Chamber of Commerce, assistant secretary treasurer.

MARSHALL HETTRICK, formerly publicity manager of Fokker Aircraft Corporation, Hasbrouck Heights, N. J., has resigned to become assistant to the advertising manager of the Bond Electric Corporation of Jersey City, Chicago and San Francisco.

C. E. BLOSSER has been appointed district sales manager in charge of the Dallas, Tex., factory branch of the American Eagle Aircraft Corporation, Kansas City.

Test First American Savoia

NEW YORK (N. Y.)—Test flights of the first American-manufactured Savoia-Marchetti planes were scheduled this week, according to the announcement of Enea Bossi, president of the American Aeronautical Corporation, this city. The plane known as the American Savoia Marchetti S-56 is a three-place training and sport amphibion powered by a Kinner engine.

Schools and Colleges

UNIVERSITY OF PITTSBURGH will install courses of college grade in aeronautics in the engineering school in co-operation with the Penn School of Aviation of the Pittsburgh Aviation Industries Corporation.

NATIONAL AIRCRAFT CORPORATION, which has taken over the Western College of Aeronautics and Western Dusters, Inc., at Los Angeles, is to expand the school activities to take care of the increasing enrollment.

UNIVERSAL AVIATION SCHOOLS at St. Louis has started an advance course in both sea and air navigation.

MID-AMERICAN AIR COLLEGE has been organized at Hutchinson, Kan., by the Hutchinson Airways Corporation.

U. S. AIRCRAFT ENGINEERING SCHOOL, Kansas City, Mo., is in the midst of an expansion program.

AERONAUTICAL CALENDAR

Aug. 18-23	Ohio Good Will Air Tour, starting from Port Columbus and ending at Cleveland during the National Air Races.
Aug. 24-Sept. 2	National Air Races and Aeronautical Show, Cleveland, Ohio.
Aug. 26-28	Joint Aeronautic Meeting of the Society of Automotive Engineers and the Aeronautical Chamber of Commerce, Hollenden Hotel, Cleveland.
Aug. 27-28	Second meeting Western States Aeronautic Association, Salt Lake City.
Sept. 2-7	Class C Aviation Exhibit, Rochester Exposition at Rochester, N. Y.
Sept. 6-7	Schneider Cup Race, over the Solent, Cowes, England.
Sept. 23-28	Fourth Annual New England Aviation Exposition, Boston Garden, Boston, Mass.
Sept. 28	Gordon Bennett Balloon Trophy Race, St. Louis, Mo.
Oct. 5-21	National Air Tour, Starting from Ford Airport, Dearborn, Mich.
Oct. 12-27	Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Tex.
Oct. 24-25	Conference on Municipal Airports at Washington, D. C., under auspices of the American Road Builders Association.
Nov. 18	Lehigh Airport Design Competition closes, Lehigh Portland Cement Company.
1930 February	National Air Show, auspices Aeronautical Chamber of Commerce, St. Louis.
Feb. 5-12	New York Aviation Show, auspices Aviators Post, American Legion.
April 5-13	All American Aircraft Show, Detroit.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.
Aug. 18-23	Ohio Goodwill Air Tour, starting from Port Columbus and ending at Cleveland.

New Firms Announced

SPENCER AIRCRAFT ENGINE, INC., Springfield, Mass., capital 100 shares no par value stock, by George G. and Frank D. Law of Springfield, and Louis Spencer of Hartford, Conn., to finance the building of an experimental airplane engine invented by Mr. Spencer and deal in and repair engines.

SWIFT WING AIRCRAFT COMPANY, Lynn, Mass., capital 500 shares no par value stock, by M. Vincent Doten, of Cambridge, Isaac T. Johnson and Roscoe P. Timson, both of Lynn, to manufacture and deal in aircraft.

COMET AIRWAY, INC., 11 West 42nd Street, New York City, capital $20,000, by John J. Heeb, Edna M. Selmar, and Herman Rosenstein, to deal in aircraft and airplane accessories.

AIRCRAFT SHARES, INC., Baltimore, Md., capital 80,000 shares no par value stock. Townsend Scott, of Townsend Scott & Son, is president; Temple N. Joyce, vice president, and Capt. George Cobb, secretary and treasurer; directors, Maj. William D. Tipton, Capt. Charles A. Masson and Paul V. Burwell; a holding company for selected aircraft stocks.

NATIONAL AIRCRAFT WELDING SCHOOL, Kansas City, Mo., 500 shares of no par value, by Sidney Q. Noel, Alma I. Noel and William L. Baudette; to operate a school in aircraft welding and sheet metal work, manufacture and repair airplanes and conduct experimental work in connection therewith.

AMPHIBIAN AIRCRAFT CORPORATION, Los Angeles, Calif., Louis F. Vremsak, president, to manufacture amphibion type planes.

Y. AND R. AIRWAYS, INC., Salida, Colo., capital $20,000; by R. D. Young, E. C. Royer, V. V. Young.

Representatives Named

LACTEBUCK—J. Waldo Hall, Raton, N. M.

WALLACE—Mackensie-Morrow Aviation Company, Portland, Ore.

VOICEPHONE (BOWERS)—Universal Aviation Corporation.

ARROW—Acosta Aircraft Corporation of New Jersey, for Pennsylvania and New Jersey.

STANDARD STEEL PROPELLER—Universal Aviation Corporation, St. Louis.

Report Fokker F-10 Deliveries

HASBROUCK HEIGHTS (N. J.)—Two Fokker F-10's were delivered recently by the Teterboro plant of Fokker Aircraft Corporation. One of them is to be used on the Los Angeles-El Paso route of Standard Airlines, a subsidiary of Aero Corporation of California. The other is the seventh in a fleet of this type operated by Pan American Airways between Florida, the Gulf States, the Antilles and South America. Of a total order for 21 Fokker planes, nine have already been shipped to Japan Air Transport lines.

AIRPORTS AND AIRLINES

Hold Hearing On Mail Route

New East-West Trunk Line Aspects Presented

WASHINGTON (D C)—Representatives of St Louis and the Southwest submitted to the Inter-Departmental Committee on Civil Airways on August 1 evidence in support of the proposal for a new east-west air mail trunk line from New York to St Louis and beyond. The interest that this project has created was evidenced by the attendance of about 100 persons at the hearing. Walter F Brown, the postmaster general, presided

Representatives of the financial and business interests in St Louis presented testimony covering every angle of the situation in that territory with respect to present and projected air mail service While the delegation from that city expressed no particular preference concerning the location of the route to New York other than that it should be direct, spokesmen for cities in the intervening territory presented conflicting proposals that the route should be so located as to serve them.

Alternative Routes

The principal alternatives are a northern route between Indianapolis and Columbus and a southern route via Louisville and Cincinnati If the line is extended beyond St Louis to Dallas and Fort Worth as tentatively proposed, the Department was asked to consider stops at Joplin, Mo Tulsa and Oklahoma City and Paris Tex

Cleveland A Newton, former representative in Congress from Missouri directed presentation of the case for St Louis He urged that overnight air mail service between St Louis and New York must be inaugurated if St Louis is to receive the benefits that should accrue from the air mail system Air mail from St Louis to New York, via Chicago he said now is late on about one third of the arrivals scheduled Mr Newton explained that the closing hour of 3 p m on air mail to the East is too early for the proper conduct of business whereas the establishment of a direct route with a closing hour of 5 p m would induce banks and business interests in St Louis to dispatch a large part of their eastern mail by air

An elaborate analysis of commercial activities in St. Louis and the Southwest was presented by Walter Weisenberger president of the St Louis Chamber of Commerce A series of charts

Showing the route of the air mail service between Montreal and Santiago, Chile. The Miami-Santiago section is operated by Pan American Airways and associated companies

was exhibited to show that St. Louis is the gateway to the Southwest and that extension of direct air mail service to this territory would be a new source of large revenue to the air mail system A survey has disclosed, according to Mr Weisenberger, that St Louis firms now furnishing approximately 100 lb of air mail a day for transportation over the present route via Chicago would supply approximately 300 lb. per day over a direct route for delivery in New York the next morning He pointed out that a direct route between St Louis and New York would follow existing channels of trade through a densely populated industrial section of the country There are 171 cities having a population of 15,000 or more within 100 mi of the proposed route that would make use of the new service, said Mr Weisenberger. He quoted Colonel Lindbergh to the effect that St Louis should have a direct air mail line to the East

(Concluded on Page 320)

P. A. A. Operating Entire Miami-Santiago Service

MIAMI (FLA.)—The first complete operation of its entire air mail service between here and Santiago, Chile, was accomplished July 29 when the Pan American Airways Sikorsky amphibion landed at the Pan American Airport at 5 p.m. with its load of mail. This signalized the fact that an mail service is now available along a trunk airway about 5 874 mi long across the Carribean Sea through Central American countries, the Canal Zone and down the west coast of South America to Santiago

This initial northbound service over the route was started July 21 the plane leaving Santiago at 8 a m The flight north required eight days as compared to the three weeks usually taken by steamer Six planes were used in flying the various stages composing the route Three allied concerns operate the airway namely Pan American Airways Pan American-Grace Airways and Peruvian Airways, a Grace Line concern [See the accompanying map for illustration of the line]

Southbound service was started July 17 when a plane took off for Santiago at Christobal Panama Canal Zone, at 7 a m The mail arrived at its destination at noon on July 21. The line is to be flown over three times a week in each direction according to the air mail contract This is the route which was involved in a controversy last spring between Pan American and American International Airways the latter claiming that the former had been awarded the contract under unsatisfactory circumstances Pan American won the dispute

American International however is continuing its efforts without benefit of government aid in the nature of mail contracts to establish an air service down the west coast of South America For this purpose it is using the twin-engined Sikorsky formerly owned in Capt Rene Fonck, to survey the proposed routes The machine recently was flown across the Andes from Chile to Buenos Aires

Plans $3,000,000 Private Port

SACRAMENTO (CALIF.)—Development of a $3,000,000 private airport is now in progress on a 200-acre site located five miles to the southeast of this city The project is the conception of Charles E Wright, real estate operator of the Sacramento River Valley who owns the land and is supervising its development Modern grading equipment is being used to give the entire field a uniformly smooth surface for airplane operations

To Test Refueling Idea on Mail Plane

SEATTLE (WASH.)—Practical testing of the refueling idea is planned by the Postoffice Department and the Army in cooperation with Boeing Air Transport Capt Ira Eaker of the Air Corps will endeavor to fly a Boeing mail plane christened "The Shuttle" twice back and forth across the continent from New York to San Francisco with the aid of two Army and two Boeing refueling planes Lieut Bernard Thompson will be Captain Eaker's companion on the trip

Under the tentative schedule The Shuttle will leave San Francisco at 10 a.m. some morning during the third week of August will refuel at Elko Cheyenne and Omaha discharge mail at Chicago, refuel again at Cleveland and arrive in New York at approximately 6 a m This would lower the usual time for trans-continental air mail by seven hours A substantially similar schedule will be followed on the western trip.

If the plane is still in the air after twice completing the round trip, it may be flown to Cleveland to hover over the field there during the National Air Races, in an effort to break the refueling record set by Dale Jackson and Forest O'Brine at St Louis recently The Shuttle is a standard Boeing 95 mail plane and will be engaged in regular commercial service during the whole course of the trans-continental flights opened up to cruising speeds comparable to those of regular mail service according to present plans The experiment will attract much interest

Braniff Inaugurates New Southwest Line

OKLAHOMA CITY, (OKLA.)—Through inauguration of a new service between this city and Amarillo, Tex., by Braniff Airlines, a division of Universal Aviation Corporation an 11 hr. service between this section and Los Angeles, is provided The Amarillo-Los Angeles part of the service is flown by the regular Western Air Express planes operated between the West Coast and Kansas City Mo

The four-hour flight is made westbound from here on Monday Wednesday and Friday of each week and the eastbound trips are made each Tuesday, Thursday and Saturday Points touched by the Braniff planes are Tulsa, Oklahoma City Dampa, Tex and Amarillo.

Western Air Express recently made Amarillo an additional point of call on its line.

Pitcairn Improves Service

JACKSONVILLE (FLA.)—Sunday air mail service began between Atlanta and Miami August 4 Pitcairn Aviation Inc. in inaugurating this service announced that planes will also handle express on the route.

Catalina Island Line Busy

LOS ANGELES (CALIF.)—According to a report just issued by the Western Air Express, an increase of 100 per cent in air travel between here and Catalina Island in July over the month of June, is noted During the last 31 days it says 2 448 persons were carried between the two points in amphibion planes from the Valley Boulevard Airport and in seaplanes from Wilmington.

New Firm Plans Ottawa-Montreal Line

MONTREAL (QUE.)—The formation of the Fast Air Service Transport Company, Ltd., marks another outstanding development in local aviation circles. The company has been recently formed to establish a regular service between Montreal Quebec and Ottawa Additional stops will be added at a later date and an air taxi service will be available at all times

The company will operate a fleet of fifteen planes, carrying from two to eight persons, all being of the monoplane cabin type. They will operate from the St Hubert Airport until the company's own field at Pointe Aux Trembles is ready for operations. This field is in the course of construction and is expected to be completed in the near future. In all, it covers a square mile in area

Two planes are already at the St. Hubert port and the others will be delivered during the course of the next month Among the type of planes which the F.A.S.T service will rise will be Bernerd planes, similar to the "Yellow Bird," which recently was flown across the Atlantic

The officers and directors of the new company are: R D Lehan president; L. P J Aupick, vice-president, Lionel St Jean, secretary, Lionel LeBel, treasurer; and I F. Price, William Crawford, F B Black, D. L. Young and P Taraseon, directors

T.A.T. Announces Statistics on Pilots

ST. LOUIS (MO.)—First pilots of Transcontinental Air Transport, Inc., have an average of 3,000 hr of flying time The average age of the 34 men comprising both first and second pilot groups is 26 years The oldest is 35 and the youngest, 21

A survey which brings out these figures also discloses that the average height is 5 ft 11 in, and the average weight is 160 pounds. The tallest is 6 ft 1 in., and the shortest, 5 ft 4 in The heaviest man weighs 185 pounds and the lightest, 135

Twelve of the group are married and 22 are single The unmarried men are largely the second pilots. Almost without exception, the pilots are graduates of army training fields and hold commissions in the Army Reserve Corps Only one or two, however saw active flying service in the World War

Southern Changes Rates and Schedules

FORT WORTH (TEX.)—Coincident with an announcement of new and faster schedules which will bring Mexico City within 12 hr of Dallas and Fort Worth Robert J Smith, general traffic manager of the Southern Air Transport system, has announced a 16½ per cent general reduction in air passenger rates This is the first general reduction in air passenger rates announced by the company.

Heretofore the rate has been $.12 an air mile Beginning August 1 it will be $.10 an air mile. This means that the one way fare from Dallas or Fort Worth to Houston will be $23.30, $25.50 to San Antonio instead of $31; $51.70 to Brownsville instead of $64 and $57.90 from Dallas to El Paso instead of $71

From August 1 to August 15, inclusive, also, the company offers round-trip excursion rates on all lines, which amounts to fare and a half Thus the round trip excursion rate from Fort Worth or Dallas to Houston will be only $34.94 whereas the one way rate has been $30 Similarly the round-trip excursion rate to Brownsville from Dallas or Fort Worth will be $77.55 whereas the one-way rate in the past has been $64

The new schedules are as follows:

Passenger Route No. 1

South Read Down				North Read Up
8 00 a.m.	lv	Forth Worth	Ar	5 55 p.m.
8 25 a.m.	lv	Dallas	Lv	5 30 p.m.
11 00 a.m.	ar	Houston	Lv	3 00 p.m.

Passenger Route No. 2

South Read Down				North Read Up
10 45 a.m.	lv	Dallas	Ar	5 30 p.m.
11 05 a.m.	lv	Forth Worth	Lv	5 10 p.m.
12 05 p.m.	lv	Cisco	Lv	4 10 p.m.
12 40 p.m.	lv	Abilene	Lv	3 35 p.m.
1 05 p.m.	lv	Sweetwater	Lv	3 10 p.m.
1 45 p.m.	ar	Big Springs	Lv	2 30 p.m.
2 10 p.m.	lv	Big Springs	Ar	2 05 p.m.
2 55 p.m.	lv	Midland	Lv	1 40 p.m.
4 15 p.m.	ar	*El Paso	Lv	10 00 a.m.

*Mountain Time

Passenger Route No. 3

South Read Down				North Read Up
8 30 a.m.	lv	Dallas	Ar	2 20 p.m.
8 55 a.m.	lv	Fort Worth	Lv	2 00 p.m.
9 55 a.m.	lv	Waco	Lv	1 00 p.m.
10 55 a.m.	lv	Austin	Lv	5 05 p.m.
12 00 a.m.	lv	San Antonio	Lv	4 35 p.m.
12 30 a.m.	lv	San Antonio	Ar	3 55 p.m.
2 00 p.m.	lv	Corpus Christi	Lv	2 30 p.m.
3 45 p.m.	ar	Brownsville	Lv	1:00 p.m.

Start Boston-White Mountain Line

BOSTON (MASS.)—A new line out of this city was started July 29, when the White Mountain plane service, between Whitefield, N. H., and the Boston Airport began its regular trips The schedule has been so arranged that connection is made with the Colonial Air Transport service between this city and New York, the planes making one trip each way daily to connect with the New York plane leaving Boston at 11 30 a.m. and returning to Whitefield 5 min. after the New York plane arrives at 1 35 p.m. each afternoon Flying time is 1 hr 55 min., including a stop at Concord, N. H. The fare is $30 each way The Nehamco Air Service will furnish ground personnel in New Hampshire

AIRPORT CONSTRUCTION PROJECTS

The Austin Company of Cleveland, Ohio, has been retained by the Chamber of Commerce of Scranton Pa, to assist in the selection of an airport site for that city Following the selection of the site the Austin Company will prepare the layout for the field Rapid Aviation Inc., of Omaha which next year will take over the Council Bluffs (Ia) Airport under a five-year lease, has built a new all steel hangar and is beginning construction of another Both are 44 x 30 ft New York Air Terminals Inc, has been taking up options on the large Secaucus (N J) tract for its airport development.

As soon as materials can be contracted for Dallas Airports Utilities Corporation will begin construction of its $75 000 hangar at Love Field The hangar will be approximately 330 ft long and 150 ft deep The new 700-acre Dry Ridge Airport being developed by the Main Aeronautics Company of Pittsburgh will be ready for use by August 15, according to Maurice R. Scharff, president of the organization The erection of a 50 x 100-ft. Blaw Knox steel hangar is nearly completed and several paved runways are in process of being laid

Add to Columbus Area

The Hyannis (Mass) Airport is to be greatly enlarged during the fall A steel hangar is to replace the barn and a large additional tract of level woodland has been purchased by Robertson Ayling, the manager, and it will be cleared for additional runways Emergency legislation passed by the Columbus (Ohio) city council has authorized the purchase of ten acres of additional ground to be used in connection with the development of Port Columbus, the rental of eight of the office rooms in the administration building and the furnishing of the building.

H J Barneson of the Barneson Brokerage Company Los Angeles has announced the purchase of 220 acres of land at the intersection of Sawtelle and National Boulevards for the purpose of constructing a commercial airport The price was said to be about $1 250 000

Woodruff De Silva acting director of Los Angeles' airports has requested the city council to appropriate $131 000 for further improvements at the Municipal Airport, $75 000 of which is to be expended for additional hangars $20 000 on runways, $10 000 on utilities $20 000 on drainage and $6 000 for installation of a radio address system De Silva also filed with the council a lease agreement with the White Eagle Aircraft Company for eight acres of ground to be used by that concern for factory and display room purposes

Salem Ore dedicated its new $50 000 airport on August 8 the first day of the Department of Oregon American Legion convention The city expects eventually to develop a class A airport The airport includes 215 acres of level land about a half mile south of the city limits It is clear of all obstructions except power lines along the highway which skirts one side The lines are to be placed underground.

Four runways are now being completed All are now 100 ft. wide and will be made 300 ft Their lengths are north-south 3 300 ft ; east-west, 3 600 ft ; southwest-northeast 3 400 ft, and southeast-northwest 4 100 ft No surfacing is planned for the runways other than to roll them and spread some oil to lay dust Because of the gravelly nature of the soil the management expects eventually to make practically the whole field a runway

Building Everly Factory

Only one hangar an 80x100 galvanized iron structure is planned now Future plans call for a row of hangars along the northeast side of the field. Lee Everly pilot and plane builder, has been named superintendent of the port The factory in which the Everly monoplane recently tested will be built is under construction at the airport. The committee in charge of the project includes Walter Townsend W W Rosebraugh and Paul Johnson representing the city council Jack Elliott, Carl Nelson and Brazier C Small, American Legion and George Vick, Fred Erickson and Oliver Myers, chamber of commerce

Among the airports recently dedicated there is the one at Glens Falls N Y Port Mills Lorain Ohio the amphibion base at Pittsburgh Pa Williamsport Pa Grand Island Neb Johnstown Pa Brainerd Minn and York Neb Among the airports to be dedicated are August 24-25 Big Spring Tex ; September 10-15, Carroll, Ia ; August 10-11 Sweetwater, Tex

Reports Western Mail Interest

WASHINGTON (D C)—Spirited bidding is expected by Assistant Postmaster General Glover for the contract to operate the new air mail route from Pasco to Seattle Pasco to Spokane and Pasco to Portland Bids will be opened August 15 This interest is attributed to the keen appreciation of air mail throughout the West and Northwest which he declared following an inspection trip through that territory to be much in advance of the interest displayed in the East During the trip he observed also the wide response made by postmasters in that territory to the appeal of the Guggenheim Fund

Union Oil to Service Line

LOS ANGELES (CALIF)—Following a survey now being made by officials of the Union Oil Company of California a chain of gasoline and oil depots will be established along the Los Angeles-Mexico City route now being flown by Pickwick's Latin-American Air Transport Company

Northwest Adds Night Mail Service

MINNEAPOLIS (MINN)—Night air mail service between the Twin Cities and Chicago was inaugurated August 1 by Northwest Airways Inc, air mail contractors giving three daily mail services between the two points

Planes leave Wold-Chamberlain field here and the Chicago Airport at 11 30 pm and arrive at the opposite termini at 3 45 am Stops are made both ways at Milwaukee Taper-wing Waco biplanes powered with Wright J6 300-hp Whirlwinds, are used Leon S De Long, M J. Freeburg and Lee Smith are pilots on the new service, according to the announcement

Hold Hearings On New Mail Routes

(Continued from page 318)

The St Louis airport costing $2 000 000 will be completed within a year according to Walter Neun acting mayor of the city O M Attebury, deputy governor of the Federal Reserve Bank at St Louis stated that the present closing hour on air mail for New York is entirely too early but that all bank mail would go by air over a direct route to New York He explained incidentally that the Southwestern banks now are able to get their remittances to Chicago by air mail via Kansas City 24 hr, ahead of St Louis banks although St. Louis is 300 mi nearer.

The request of business interests in Dallas and Fort Worth for extension of the route into Texas was supported by Senators Sheppard and Connally Senator Thomas and Representative McClintock of Oklahoma urged that if the route is put through to Texas, stops should be made in Oklahoma Representative Manlove of Missouri, presented Joplin's bid for an air mail stop there and Representative Patman of Texas urged that Paris also should be considered as a stop en route

Rival delegations presented claims for preference in the location of the route between St Louis and New York Representative Ludlow of Indiana stated the advantages of the northern route via Indianapolis and Columbus as opposed to the southern route via Cincinnati and Louisville Planes over this route he stated would avoid the fogs over the Ohio River He produced data supplied by the Weather Bureau to show that weather conditions are much better over the northern route The potential users of air mail said Representative Ludlow are the industrialists of the north and not the cotton and tobacco growers of the south Cincinnati's plea for location on the new airway was presented by Representative Hess of Ohio and a delegation of city officials and business men Representative Hess stated that Cincinnati is much nearer to a direct line between New York and St Louis than is Indianapolis

FOREIGN ACTIVITIES

Soviet Monoplane To be Flown to U. S.

MOSCOW (RUSSIA)—The Russian-built airplane "Spirit of the Soviets" is being groomed for a proposed flight from this city to New York City by way of Alaska The machine is a twin-engined monoplane, the latest product of Russian aircraft engineering. It will be manned by a crew of four, which will include Semian Alexandrovitch Stettakov, pilot-commander Philip E Bolotov second pilot Boris Sterligov navigator, and Dmitri V Fufaev mechanic

The route of the flight will be across Siberia and the Aleutian Islands to Alaska, thence down the Pacific Coast and eastward across the United States Among the stops will be those at Petropavlovsk, Kamchatka Commander Island, Attu, Dutch Harbor, Unalaska, Seward and Sitka, Alaska, Seattle San Francisco, Omaha, Chicago, and New York. The machine probably will be in the United States for six weeks Arrangements have been made with the United States Government for field and radio assistance It is expected that the flight, if carried out on schedule, will take between twenty and 25 days.

Maj. Ramon Franco Dismissed

MADRID (SPAIN) — Maj Ramon Franco commander of the recent ill-fated attempt to fly to New York from Carthagena which ended in a forced landing near the Azores, has been dismissed from the Spanish Air Service

Expand German Glider School

BERLIN (GERMANY)—The gliding school, located at Grunau, which was opened in 1924, is to be enlarged through money made available by the German Aeronautical Association. About 250 gliding pilots have graduated from this school and the general interest in gliding has made the expansion necessary Other gliding schools are said to be planning expansion also.

Marconi Develops Light Plane Equipment

LONDON (ENGLAND)—A light weight wireless telephone set for the use of light planes has been developed by the Marconi Wireless Telegraph Co Ltd The set is equipped principally for telephony only because of the general lack of acquaintance with the Morse code, although it is possible to intercept telegraph signals The Marconi type A D 22 as the set is designated, weighs about 60 lb, and measures 9 x 7 x 16 in. This weight includes the complete instrument with microphone, wind-driven generator accumulator, aerial and connecting leads

The transmitter has a range of between 50 and 75 mi, using a power of 75 watts The receiver exceeds this range considerably The wave range on both transmitter and receiver is 850 to 950 m, the international aircraft wave band but it is possible to switch the 600 steamship wave length

Junkers Concern Makes All-Metal Light Sport Plane

DESSAU (GERMANY)—The Junkers concern here has built an all-metal two-place monoplane for the sport flying world. It is designated as the A 50 It has the typical Junkers low single wing construction The wing is built of four tube spars with corrugated duralumin covering The fuselage likewise, is built up of tubes and the duralumin covering the fuselage being designed in oval section

The plane is fitted with two cockpits in tandem and dual controls are provided for, the rear seat being usually occupied by the pilot The controls are operated by push and pull rods It is powered by the 80-88 hp Armstrong Siddeley Genet engine. Its general specifications are

Span 32 ft 9½ in , length 22 ft 10½ in height 6 ft 6 in ; wing area 136 sq ft weight empty 650 lb weight loaded 1 212 lb ; maximum speed 103 m p h ; cruising speed 84 m p h landing speed 46 m p h., ceiling 14 760 ft range 418 mi

Gloster "Survey" Plane Announced

LONDON (ENGLAND)—The Gloster Aircraft Company Ltd, has developed recently what it calls the "Survey" a plane to be used primarily for survey and photographic work. Decision to build a machine particularly adapted to this sort of aerial work was prompted by the increasing volume of air survey being undertaken in the various parts of the British Empire. The company claims however, that the machine is easily adapted to passenger or freight carrying if not desired for strictly survey purposes.

The plane is a twin-engined biplane fitted with two Bristol Jupiter II geared, commercial type, air-cooled, radial engines of 460 hp each It may be used either as a land plane or seaplane. Construction is metal throughout with the exception of the wing covering, which is of conventional doped fabric.

The fuselage is divided into three sections—front, center and rear The pilot's cockpit is situated in the nose allowing unusually good forward and downward vision The middle section is fitted up as a photographic compartment with special equipment Three separate camera positions are provided on the machine The rear section contains no compartments

The wings have the Gloster patent lattice style construction which the company has been developing since 1923 It is said to be especially suitable for thick wings Ailerons of the balanced Frise type are fitted to the lower wing Dual controls are provided

To Study England's Civil Aviation Needs

LONDON (ENGLAND) — Lord Thomson Secretary of State for Air has announced the formulation of a Civil Aviation Consultative Committee. This innovation in British air circles has been introduced for the purpose of studying all questions relative to civil aviation in all parts of the empire Seven leaders in aviation and other forms of transportation have been selected. They are as follows :

Hon F Montague Under-Secretary for Air is Chairman ; Sir William Brass a Conservative member of the House of Commons Sir Archibald Sinclair, Sir Allen Anderson representing shipping interests ; F G Evans representing the railways Sir Roland Nugent representing the Federation of British Industries, and Lieut Col Mervyn O'Gorman representing aviation interests

Chinese Pilot Tells Of London-Amoy Hop

LONDON (ENGLAND)—An interesting description of the flight of Mr Wenlin Chen, Chinese pilot, from here to Amoy, China, in an Avro Avian, has been described in the recent issue of *Air*, the official organ of the Air League of the British Empire. The machine arrived at Amoy May 24. The report, in part, is as follows:

"News of his expected arrival had reached Amoy by telegram and many officials and local residents assembled at the aerodrome to welcome him. About three o'clock the buzz of an aero-engine was heard; shortly after, the Avian came into sight flying about 1,000 ft and flew over the town and then landed at the Amoy Naval Acrodrome, having previously circled the spectators.

"Mr Chen's flight companion was Mr Johanson, a Danish aviator of many years' experience, and throughout the flight he had shared the piloting and between them they had attended to the running repairs of the machine. Mr Chen reported that these repairs had never exceeded the usual daily inspections, cleaning of plugs and filters, and adjustment of tappet clearances. Owing to the tropical rains through which they had to plough their way two propellers became damaged, and these had to be changed, but as he said, these replacements were only made to keep the machine in perfect condition.

"The object of the flight was not to make records. Mr Chen wished to visit many places in Europe on business and he decided that his best method would be to use one of the four Cirrus Avians he purchased in England. He set out from Croydon without any publicity or fuss, and passing through Germany, Egypt, and Persia he eventually arrived in India. Here bad luck overtook both the aviators; they were taken ill with malaria and had to spend nearly two weeks in hospital. As soon as they were well they proceeded across India to Rangoon, where they remained for four days to enable Mr Chen to visit his mother.

"From Rangoon the flight was continued across French Indo-China to Hanoi, and from here Mr Chen decided to fly via Pakhoi and Canton to Amoy as quickly as possible, in view of the trouble in Kwangtung and Kwangsi."

Bremen Plane Again Speeds Mail

BERLIN (GERMANY)—Mail posted in New York July 26 was received in this city August 1, the elapsed time being about five and a half days as compared with the usual eight and a half. This was made possible by the catapulting of the Heinkel H-12 mail plane from the steamship "Bremen" near Cherbourg. The approximately 500 mi. to Bremen, where the plane landed, was covered in about 4 hr at the average speed of more than 120 mph, in spite of rain. The mail was taken from Bremen to Berlin in another plane.

French Woman Seeks Record

PARIS (FRANCE)—Mlle Maryse Bastie a French woman pilot, took off from Le Bourget, July 28, at 5:17 a.m. and remained in the air alone until 8:30 a.m. the next day. The elapsed time was 26 hr 46 min. The endurance record established by Miss Elinor Smith, over Long Island was 26 hr 21 min 32 sec. Mlle Bastie remained in the air 24 min 28 sec longer than the American girl. She had to contend with rain and wind during the night. She has to her credit, also a flight of 937 mi. from Paris to the Baltic Sea.

Develops Device For Dropping Mail

BERNE (SWITZERLAND)—A Swiss engineer has invented an apparatus called the "Meteor" according to the United States commercial attaché here, which will permit of the delivery of small packages of mail from a plane in flight. The apparatus consists of an aluminum shell equipped with a precision watch. A waterproof sack is attached under the shell and at the top of the shell a small parachute lies folded in a frame. The 120 mph in spite of ram.

When flying over the point at which mail is to be dropped the pilot may adjust the precision watch according to the indications on the altimeter and throw the carrier overboard. The carrier falls like a dead weight until about 100 m above the earth, when the watch releases the parachute and the package lands slowly at the spot aimed at. A larger model of the apparatus has been developed which will permit of the lowering of weight up to 66 lb.

Gloster Firm Explains Stand on Monoplanes

LONDON (ENGLAND)—The Gloster Aircraft Company, builder of one of the planes to be flown in the Schneider Trophy Contest in September has released the following announcement, quoted in part:

One of the interesting features of the 1929 Schneider Trophy Race is that the Gloster company has built its craft as a monoplane. Ever since the World War, the Gloster company has been producing Schneider Trophy machines and high speed craft, all of which have been biplanes. The policy for 1929 was hailed as the final justification of the monoplane for high speed flying.

It is now possible to reveal that this change over to monoplane design was in effect, forced on them, and the company still is of opinion that a biplane is as fast as a monoplane. It was originally intended to construct a biplane. Models of this biplane were made and it was called the 'Gloster V."

Engine Weight Big Factor

Wind tunnel tests were satisfactory but it was then found that the new Napier engine, in the supercharged version, was nearly 300 lb. heavier than last year, and consequently the top wing position, in order to give the correct G-G position, brought the front top spar over the cylinder block. This arrangement made it impossible to locate the top wing satisfactorily and the company was forced to the only alternative of changing over to a monoplane, which it has designated as the 'Gloster VI.' This plane will be seen at the 1929 Schneider Trophy Race.

Pilot Who Holds Distance Gliding Record

ROBERT KORNFELD well-known German glider pilot, is shown here with his glider Vienna just before taking off on the flight in July in which he established a new distance record for gliders of 150 km, or about 93 mi. It is understood that he has bettered this mark, using the same glider. A few days after these flights two glider pilots established new endurance records for gliders. Pilot Menninger of Darmstadt remained aloft in his machine 26 min, according to reports, while Pilot Meyers of Aix la Chapelle flew 24 min.

WHAT OUR *Readers* SAY

Mr. Pitcairn on the Autogiro

TO THE EDITOR

I read Mr. Osborn's article in AVIATION (of June 22) on the Autogiro with a great deal of pleasure. I am going to take the liberty of refuting a few of the statements made but this is only in the interest of accuracy and in no way detracts from my appreciation of his having written the article.

In the first place, there are no conditions that I know of under which the rotor could stop on *a properly designed Autogiro*. Senor de la Cierva found that the rotational speed of the rotor would increase as the forward speed increased on the Autogiros which had no fixed wings but only ailerons for lateral control. The Autogiros we are building are designed so that the angle between the fixed wings and the disk described by the rotor can be altered on the ground. Therefore, if it is found necessary, it will be practical to adjust these machines so that when placed in a dive the fixed wings will exercise a negative lift, thereby increasing the windmill action of the rotor which will assure a sufficient number of revolutions per minute under all conditions.

The fixed wings on the machine in which Mr Osborn flew were mounted at too great an angle of incidence, so that the proportion of total lift that these wings carry increases with the forward speed. Because of this, rotational speed decreases with forward speed. This will not be the case in future Autogiros.

The article gave the impression that great care must be taken while taxiing to prevent excessive strain on the cables which control the position of the blades while their rotational speed is slow.

There is never excessive stress on these cables. However, caution must be exercised in taxiing rapidly into the wind with the machine in which Mr Osborn flew to prevent the rotor blades from being carried too high before sufficient rotational speed is acquired to give the necessary centrifugal force to hold the blades in place. However with the self-starting device which will be employed, there will be no occasion to taxi rapidly into the wind before the rotor is turning fast enough.

The article states that when the Autogiro hits a severe bump, or is pulled suddenly out of a dive the lift of the wings becomes greater than centrifugal force. However, experience has always found centrifugal force to be more than sufficient to take care of every condition of this nature.

I recognize that from the ground it is very difficult to judge the comparative take off of an Autogiro with an airplane, unless the two machines leave the ground at the same time. However, I regret that Mr Osborn received the impression it was only equivalent to that of a good OX biplane. From comparative tests, we have found that with the Autogiro and Mailwing having the same gross load, and that after the rotor has reached 90 revolutions the take off distance is appreciably in favor of the Autogiro. Also in carefully measured tests, we found that the angle of climb of an Autogiro is considerably better than that of a Mailwing. The rate of climb is not as good but it is the angle of climb and not the rate of climb that helps one out of a small field.

Also, I would call your attention to the fact that the Autogiro up to this time is the development of one man only and that it is reasonable to expect a great deal of improvement in the near future. In fact, Senor de la Cierva has recently been able to double his rate of climb with everything else being equal, by simply changing the plan form of the rotor blades and covering them with plywood.

I do not think that the statement that the Autogiro is inefficient at low speeds is borne out by the facts. I believe that it can be demonstrated that its slow speed efficiency is greater than that of an airplane.

Mr Osborn evidently has the impression that the forward gliding of the Autogiro is much worse than is actually the case. While demonstrating the machine it was my purpose to show a steep angle of descent. As a matter of fact, the maximum forward gliding angle of the machine I have been flying, I would say, is half way between that of a Jenny and a Mailwing. Certainly, the forward gliding angle of an efficient Autogiro will be considerably better than that of an inefficient airplane.

One again let me assure you that I deeply appreciate Mr Osborn's interest in writing up the Autogiro. Because of your interest I know you will take no offense at my having written you so frankly.

HAROLD F PITCAIRN
Pitcairn-Cierva Autogiro Co.,
Philadelphia, Pa.

Editorial Comment
FROM THE DAILY PRESS

Trespass by Aviators

THE EXCELLENT OPPORTUNITY which the recorder's court in Millington, N. J., had to contribute to the jurisprudence of aviation has been passed up. The case, which promised to indicate what damages are owed by an aviator who lands inadvertently in a farmer's choice oak tree, is to be dropped. All that has come of this promising setting is assurance of exemplary conduct on the part of the airmen in the future.

The farmer whose tree was damaged charged the parachute jumper who landed in it, and those who rushed to his assistance, with trespassing. The case attracted considerable attention because of the strength of the sentiment it developed against aviation. The townspeople made it an occasion for complaining not only of the damage caused by parachute jumpers, but of airplane noise. One farmer is reported to have threatened to pepper these human birds with shot. The township board has passed an ordinance requiring a license fee of $500 from airport operators.

With aviation at its present state of development this case is a novelty and is looked upon with mirth. Nevertheless it has serious aspects when the possible growth of aviation in the coming decade is contemplated. It emphasizes the inadequacy of aviation law. The rights of the contending parties in such a case are wholly undetermined in a majority of the States. The statute drafted by the committee on uniform State laws, which has been adopted by twelve States, makes the operator of an airplane absolutely liable for damage caused to property he flies over, but the law in Connecticut makes him liable only where there has been negligence. The question of who owns the air above private property has not yet been settled.

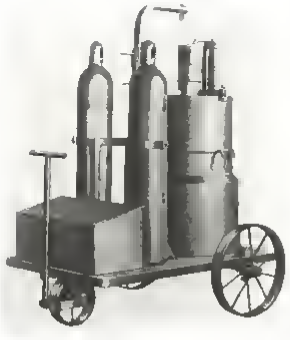
Friction is certain to develop until a comprehensive legal system for aviation has been evolved. An all-inclusive law can not be set up in a short time, and there are many points which will have to be tested in the courts. But an early statement of fundamentals would be to the advantage of aviation as well as to owners of property which is liable to damage.

WASHINGTON POST

THE BUYER'S LOG BOOK

Oxweld Generator Trucks

IN response to a number of requests for trucks suitable for the CLP-3 and CLP-2 type carbide generator, the Oxweld Acetylene Company 30 East 42nd St., New York, has recently introduced two new types of trucks to accommodate these generators. The truck designed to carry the CLP-3 generator also accommodates two cylinders of oxygen. It is oxy-acetylene welded and is sturdily constructed throughout. The generator is fastened to the steel deck by means of angle iron braces and two long bolts which are inserted in the handles of the generator and tightened by means of turnbuckles. The truck is mounted on two large wheels on the back and a third in front of the castor type makes it possible to turn in a short radius.



The Oxweld truck designed for the CLP-2 type carbide generator

A steel tool box with loop fastenings is provided and can be used for wrenches and small tools or for a welding or cutting outfit.

The oxygen cylinders are chained to a steel rack which is fastened to the deck of the truck beside the generator. A sturdy crane is provided to be used in charging and emptying the generator. With this crane it is an easy matter to lift the gas bell out of the generator. Water and residue can then be drained off through the outlet at the bottom. The crane jib is made in three sections and can be telescoped when not in use to decrease the height.

Three inch tires are provided on the 24 in. steel wheel and the castor wheel is 12 in. in diameter by 2 in. in width. All wheels are provided with grease cups for lubrication.

The truck designed to accommodate the Type CLP-2 generator accommodates one cylinder of oxygen in addition to the generator. It is intended for extreme portability and can be wheeled anywhere with ease. There are two 24 in. steel wheels and one 5 in. castor wheel operating on a roller bearing. As in the case of the larger truck all wheels are provided with grease cups for lubrication.

The company also manufactures a complete line of welding and cutting equipment.

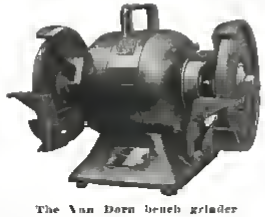
Engine Temperature Indicator

THE General Electric Company announces a temperature indicator for aircraft engines for laboratory experimental work and for general service. This device is a cold-junction, temperature compensated instrument, consisting of a thermocouple with its leads and a remote indicating instrument calibrated to read engine heat. When mounted in the cylinder heads and walls of aircraft engines it will indicate the engine temperature at any desired remote point.

The instrument operates on the principle that a junction of two dissimilar metals when heated, generates electric energy in proportion to the temperature. The chief advantage of the new device is the ingenious compensation for cold-junction temperature making it unnecessary to correct for changes in ambient temperature.

Van Dorn Bench Grinder

ANNOUNCEMENT has been made by the Van Dorn Electric Tool Company Cleveland, Ohio, of a new 6 in. bench grinder. This machine is intended for tool dressing, sharpening hand tools and grinding of all kinds. It is equipped with two 6 in. grinding wheels, wheel guards and tool rests, three wire cable and plug for attachment to the lighting circuit.



The Van Dorn bench grinder

The new Van Dorn grinder is portable, having a weight of only 36 lb. and is equipped with a convenient handle, so that it can be moved easily from place to place. Rubber pads are fitted on the base eliminating the necessity of holing the grinder to the bench for light work. The shaft is mounted in ball bearings with dust tight housings, while the motor is also completely enclosed.

Glidden Aircraft Finishes

A COMPLETE line of protective finishes for aircraft manufacturers as well as other branches of the aeronautic industry is offered by The Glidden Company which has main offices in Cleveland, O.

Included in the "Glidair" finishes are polished surfaces, speedenamel, spar varnish, metal primers, plywood filler, blush retarder, Ripolin enamel, pigmented dope, dope proof white, clear nitrate dope, clear acetate dope, clear tube coating, clear gloss top coat clear plywood sealer, semi-pigmented dope, iron oxide oil primer, flexible lacquer enamel, aluminum mixing varnish, dope and lacquer reducers, wood and metal preservatives (Glidnoil).

STUDENTS BECOME BETTER PILOTS More Quickly With ROBIN TRAINING

The quiet of the closed-cabin Robin makes conversation easy, thus permitting student and instructor to ask and answer training questions in the air—where they count. This saves time and affords thorough instruction.

Exclusive performance and economy of operation strongly recommend the Robin as the foremost closed-cabin training plane that is available today.

CURTISS FLYING SERVICE

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CURTISS-ROBERTSON AIRPLANE MFG. CO
CURTISS AEROPLANE AND MOTOR CO., INC.
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27 West 57th Street, New York City, N. Y.

© Fairchild Aerial Surveys, Inc.

This picture shows the accessible location of the N. Y. A. T. Airport at North Beach, Queens, on Bowery Bay. The air view at the left shows the port at the time it was opened on June 15th, 1929. The large ramp and the convenient dock for motor-boats can be seen in the photo

THE NYAT AIRPORT at NORTH BEACH *is only 15 minutes from Manhattan now in operation for seaplanes*

HOW to get in and out of New York City has been a problem to owners of seaplanes. In recognition of the urgent need for a marine flying base, accessible to New York, yet free from the hazards of swift river currents, changing tides, floating debris and heavy water traffic, New York Air Terminals, Inc., has selected North Beach, in the Borough of Queens, for one of its seaplane airports. Here in the quiet, protected waters of Bowery Bay, owners and operstors of seaplanes will find an ideal landing place.

By next year an excellent flying field of about 200 acres will also be available at North Beach.

Speed cruisers operating on regular schedule between the airport and East 42nd Street, Manhattan, provide quick access to the city. The running time is only fifteen minutes, affording the quickest passage from any airport to Manhattan Island. There is also a convenient motor route by way of the 59th Street Bridge.

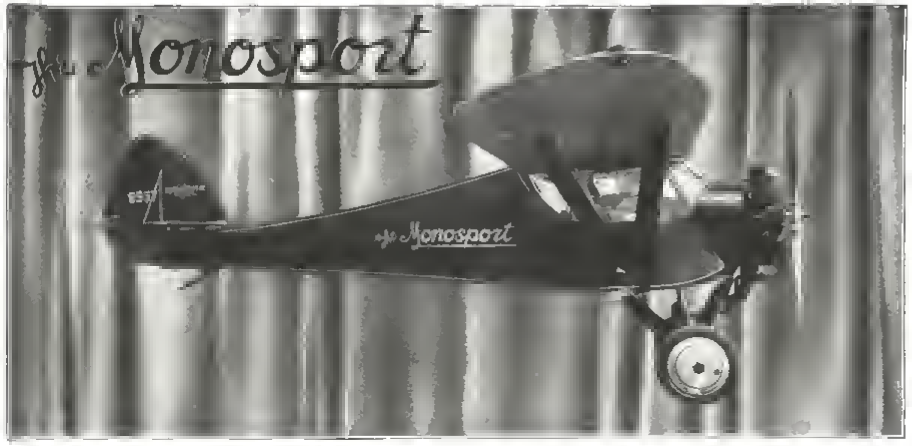
Air Transport companies, air commuters and sportsmen flyers, using seaplanes or amphibians, are invited to make use of this modern airport, constructed especially for their convenience. Here they will find every facility for the safe handling, storage, maintenance and inspection of airplanes. Manufacturers and distributors of marine aircraft will find the port ideal for demonstration purposes. Write for our bulletin A-10.

NYAT

NEW YORK AIR TERMINALS

INCORPORATED

307 WEST 49TH STREET, NEW YORK



A Deluxe Edition of Pursuit Performance

Custom Built
for
$6350
Flyaway at Moline, Illinois

FOR the sportsman pilot seeking high speed, maneuverability, built-in strength to withstand the rigors of any stunt maneuvers, coupled with all year 'round comfort and distinctive luxury, the new Monosport captures the fancy of every pilot able to qualify for its ownership.

Since its first introduction it has beaten in speed everything powered with the same engine. It takes every acrobatic maneuver known to the book with remarkable ease.

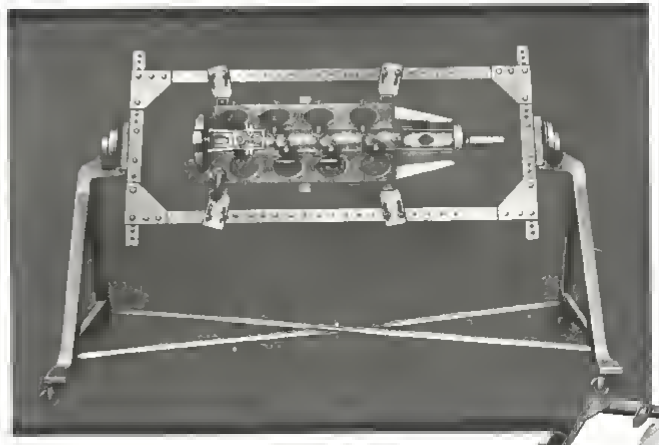
There are over 800 r. p. m. in reserve with full load. Despite its helicopter characteristics nothing is slighted—navigation lights, the panel is filled with the best instruments, seats are wide and roomy, large luggage compartment, upholstered in genuine leather, Bendix brakes, Oildraulic shock struts, steel propeller, five hours in gasoline. Colors are optional.

Smart in appearance, comfortable, strong, maneuverable, fast—$5750 with Kinner engine—$6350 with Warner engine—deliveries fifteen days after acceptance of order.

Additional information on request.

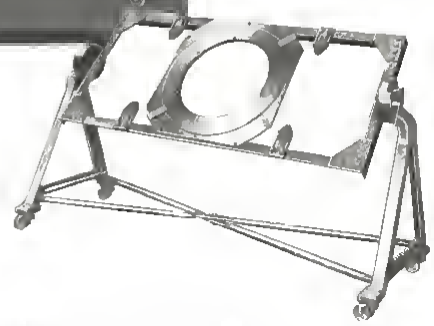
MONO AIRCRAFT CORPORATION
Division of Allied Aviation Industries, Inc.
MOLINE, ILLINOIS - U. S. A.

Cut Down Your Overhaul Time



At left Lipe Motor Stand is shown with OX5 Motor. Note slotted lugs which permit accurate angular adjustments. In line motors are similarly handled

Below you see the Stand with rotating plate for radial type motors. Motor may be revolved on two axes and clamped in any desired position



One Stand for Every Type of Motor

The Lipe Motor Stand is a necessary piece of equipment that greatly adds to the speed and efficiency of tearing down, assembling, repairing and overhauling of airplane motors. The Lipe Motor Stand is of universal type and handles in-line, V-type and radial motors to equal advantage in sizes from 60 to 600 h p.

The frame is adjustable for width and length. It swings freely in a complete circle and may be locked up in any position by a hand clamp.

Diagonal leg braces provide unobstructed standing room. Double swivel casters mounted on ball bearings facilitate easy moving from place to place even when carrying the heaviest motor.

Standard equipment includes one rotating adapter ring for any specified radial type motor; and brackets for any in-line or V-type motor. Additional adapter rings for other radial motors can be supplied.

Write Now For Full Details

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AIRPLANE MOTOR STAND

4 NEW STEARMANS ARE COMING

The New
WRIGHT WHIRLWIND J6 Series

afford on excellent opportunity for a design and engineering department ta meet the increasing public demand for greater speed, greoter maneuverobility ond greoter comfart. Haw well these demands hove been met by the Steorman Aircraft Compony is soon to be onnounced. Woit until the four new Stearmans land. , , , ,

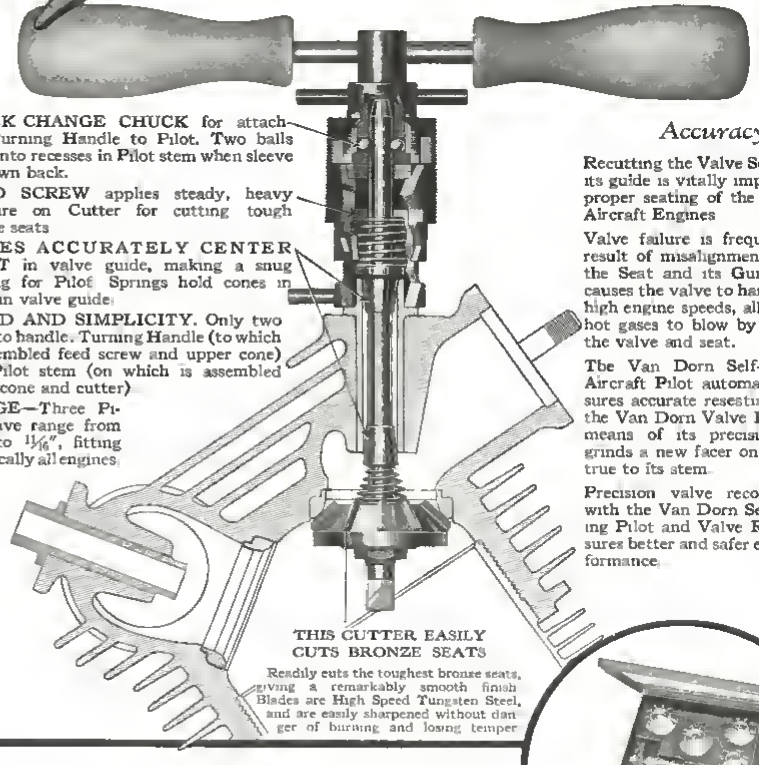
A Stearman sales franchise is something to be desired

The Stearman Aircraft Company
WICHITA, KANSAS

"NO BETTER NAME IN AIRCRAFT"

THANK YOU *for mentioning* AVIATION

"Van Dorn" SELF-CENTERING AIRCRAFT PILOT



QUICK CHANGE CHUCK for attaching Turning Handle to Pilot. Two balls drop into recesses in Pilot stem when sleeve is drawn back.

FEED SCREW applies steady, heavy pressure on Cutter for cutting tough bronze seats

CONES ACCURATELY CENTER PILOT in valve guide, making a snug bearing for Pilot Springs hold cones in place in valve guide

SPEED AND SIMPLICITY. Only two parts to handle. Turning Handle (to which is assembled feed screw and upper cone) and Pilot stem (on which is assembled lower cone and cutter)

RANGE—Three Pilots give range from 11/32" to 11/16", fitting practically all engines

Accuracy

Recutting the Valve Seat true to its guide is vitally important for proper seating of the valves on Aircraft Engines

Valve failure is frequently the result of misalignment between the Seat and its Guide, which causes the valve to hang open at high engine speeds, allowing the hot gases to blow by and burn the valve and seat.

The Van Dorn Self-Centering Aircraft Pilot automatically insures accurate reseating, just as the Van Dorn Valve Refacer by means of its precision collet, grinds a new facer on the valve true to its stem

Precision valve reconditioning with the Van Dorn Self Centering Pilot and Valve Refacer insures better and safer engine performance

THIS CUTTER EASILY CUTS BRONZE SEATS

Readily cuts the toughest bronze seats, giving a remarkably smooth finish Blades are High Speed Tungsten Steel, and are easily sharpened without danger of burning and losing temper

AIRCRAFT VALVE RESEATING SETS

Furnished in Metal Cases as Illustrated

No 55—Universal Valve Reseating Set $98 00
Will service practically all makes of aircraft engines.

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A 4-Passenger Cargo Biplane

THIS outstanding plane from the largest airplane factory in America meets the demand for a *speedy combination four-passenger cargo plane* required by transport companies and by corporations and individuals in the increasing diversity of civil flying. Its excellent performance at sea level or 12,000 feet, in sub-zero or tropical temperatures, has been demonstrated in 5¼ million miles flown by Boeing System in two years and in operation of other companies.

Model 40-B4 is the efficient, economical "seven day a week" plane for many purposes, including

Air mail-passenger routes, transporting company executives, rouning salesmen, sales demonstrations, flying merchandise to branch houses *(Model 40-B4 can be quickly changed to an exclusive cargo carrier with 1400 pounds pay load)*, emergency shipments, newspapers, oil companies *(Standard, Associated and Empire Oil Companies fly Boeing planes)*, advertising purposes, moving men and commodities to places inaccessible by rail, etc., etc.

Model 40-B4 is of superior design and typical Boeing *quality* construction. Welded steel body construction. Metal-lined cabins are sound-proofed. Deeply upholstered, comfortable seats. Forced heating and ventilation. Special night flying equipment. A 525 h p Hornet gives ample reserve power.

These are just a few of the distinctive features of this Boeing model, which is *in use on five pioneer air transport lines and by private concerns*.

You are invited to write telling us your requirements. Full details of this and other models (see specifications below) will be supplied.

BOEING AIRPLANE CO.

SEATTLE ♣ ♣ ♣ WASHINGTON

Division of United Aircraft and Transport Corporation

Boeing Offers the Following Models for Early Delivery

(All performance figures, based on maximum payload, are guaranteed, not estimated)

Write for catalog on various models.	"40-B4" Mail, cargo, 4 pass and pilot, cabin biplane	"40-B2" Mail, cargo, 2-pass. and pilot cabin biplane	"95" High speed, large capacity, mail, cargo, biplane	"100" High speed single seater land sport biplane	"204" Four pass. and pilot, cabin flying boat
Empty	3722 lbs.	3543 lbs.	3196 lbs.	1871 lbs.	3358 lbs.
Pay load	1255 lbs.	1456 lbs.	1600 lbs.	25 lbs.	915 lbs.
Useful load	2553 lbs.	2536 lbs.	2644 lbs.	829 lbs.	1642 lbs.
High speed	132 mph	132 mph	142 mph	165 mph	115 mph
Cruising speed	105 mph	105 mph	125 mph	140 mph	90 mph
Landing speed	57 mph	57 mph	56 mph	56 mph	59 mph
Engine	Hornet	Hornet	Hornet	Wasp	Wasp
Rate of climb (min.)	800 ft.	800 ft.	950 ft.	2,400 ft.	1,000 ft.
Service ceiling	15,100 ft.	15,100 ft.	16,000 ft.	24,000 ft.	17,000 ft.
Take-off run	550 ft.	550 ft.	540 ft.	100 ft.	900 ft.
Cruising range	500 mi.	500 mi.	650 mi.	525 mi.	450 mi.

Out of gas . . .

down through fog . . . into a barnyard

. . . *and out again*

That's the experience of "Stu" Auer flying a Waco "220" Taper-Wing which, he says, *"is the safest airplane built"*

A WACO "220" Taper-Wing takes off from a New York airport. It heads west with 3½ hours of gas. The veteran Stuart Auer at the stick. Robert Herron in the front cockpit.

Over New Jersey the ceiling lowers. They're gradually forced lower down . . . finally just clear the tree tops. They reach the Susquehanna River. They skim along between its high banks north towards Bellefonte.

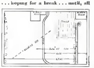
Then fog! Heavy fog! It thickens . . . closes up solidly in front . . . blends with the color of the water. So they turn and head south for Harrisburg.

Out of the fog . . . and into this!

At Duncannon the fog closes in all around them. Unable to stay below it any longer, the alternative is either to risk landing . . . or to climb above it and keep going.

"There is no other ship," Auer says, "that I would have pulled up through fog and continued west, where I had reason to believe the fog was thicker, especially as we had no parachutes."

Pittsburgh smoke coming up through the fog. No chance to sit down anywhere . . . not a hole through the fog to be seen as far as the eye can reach. Nothing to do but fly around . . . hoping for a break . . . until, all



Plan of the farm and barnyard

too quickly, the gas gives out . . . at 5,000 feet altitude!

And then . . . set the stabilizer, raise the nose slightly and slip down through the fog. Just sit there and wait. Trust to luck and WACO. Down . . . down . . . no sight of the ground until within 100 feet of it . . . almost too late to do anything.

And what ground! A farm near Bridgeport, Ohio. A small field with houses and wires at both ends . . . trees and hills at either side. And the ship in a mushing condition, one wing slightly low. Yet, even then, it answers the stick. It levels off. It lands . . . and rolls to a dead stop in 276 feet . . . safe in the barnyard! This is typical of WACO! It's a good ship to be in when emergencies come along.

"Stu" Auer says, "I believe that no other ship could land in that short space, or take off again with the load I had. I can recommend the WACO Taper-Wing to anybody who desires the safest airplane built. I know of no aircraft that is constructed as well, that flys so comfortably and that, in a pinch, will carry pilot and passengers through to safety. WACO is my choice."

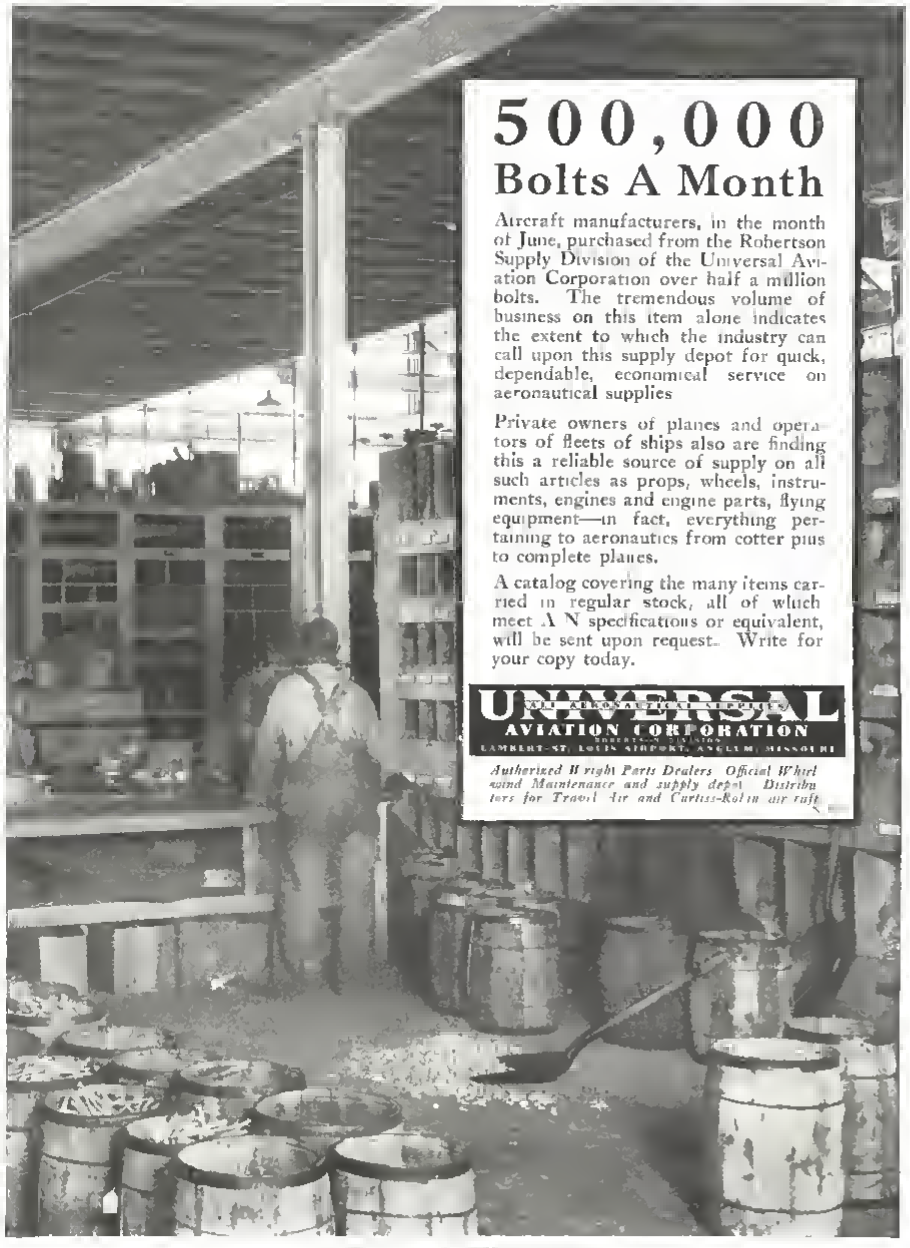
View of the plowed field . . . and hills!

And WACO will be *your* choice when you consider the performance it gives . . . the way it is designed and built . . . and the fact that more WACOS are in use today than any other make of strictly commercial aircraft. Let us send you full details on WACO airplanes, priced from $3135 to $10,000, flyaway WACO Field.

WACO AIRPLANES

"Ask any Pilot"

THE WACO AIRCRAFT CO
Troy, Ohio



500,000 Bolts A Month

Aircraft manufacturers, in the month of June, purchased from the Robertson Supply Division of the Universal Aviation Corporation over half a million bolts. The tremendous volume of business on this item alone indicates the extent to which the industry can call upon this supply depot for quick, dependable, economical service on aeronautical supplies

Private owners of planes and operators of fleets of ships also are finding this a reliable source of supply on all such articles as props, wheels, instruments, engines and engine parts, flying equipment—in fact, everything pertaining to aeronautics from cotter pins to complete planes.

A catalog covering the many items carried in regular stock, all of which meet A N specifications or equivalent, will be sent upon request. Write for your copy today.

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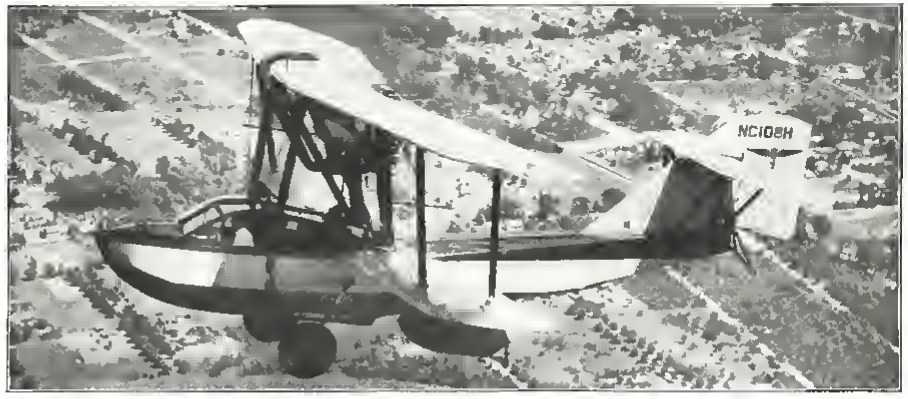
Authorized Wright Parts Dealers Official Whirlwind Maintenance and supply depot Distributors for Travel Air and Curtiss-Robin aircraft

A thousand Airports . . .
Ten thousand Waterways . . .
are HOME to the Ireland Amphibion



TO forest-hemmed lake to inland port or sea-coast resort . . . to anywhere you wish to fly! . . . Destinations are limitless with an Ireland Neptune Amphibion

Equally at home on land or water, the Neptune literally carries its airports with it. It is a luxurious Air Yacht of the most advanced design . . . the embodiment of aviation's latest refinements.

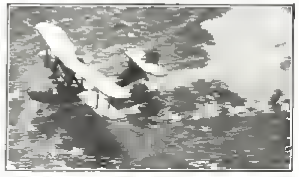
Its remarkable flexibility, sturdiness, rehability and speed are the result of many years pioneer experience in designing and constructing flying boats and amphibions.

Its light all-metal hull—its comfortable, open or closed, 5-place cabin—its ample storage space—its inherent stability—its 480-mile cruising range—make the Neptune the ideal ship for every purpose

Whether you fly for business or for pleasure makes no difference—the Neptune will answer to every demand you make of it.

See it . . . fly in it . . . ask pilots who have learned what it can do

You can learn about it at the nearest Curtiss Branch . . . any one of the forty that blanket the country with Curtiss service Or write for information.



The Neptune is unusually sensitive to control It lands easily at moderate speed and takes-off quickly on both land and water

. . .

IRELAND AIRCRAFT, INC.
CURTISS AEROPLANE AND MOTOR CO., INC
CURTISS-ROBERTSON AIRPLANE MFG. CO.
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DEPARTMENT 6, 27 WEST FIFTY-SEVENTH STREET, NEW YORK CITY, N. Y.

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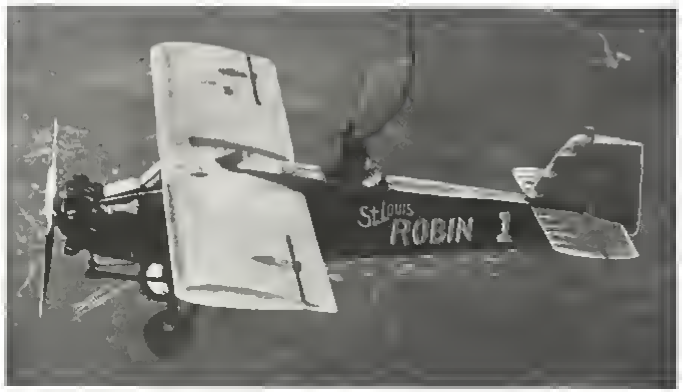
"World's Oldest Flying Organization"



At a moment of refuelling

FORREST O'BRINE and DALE JACKSON
***flying* The Curtiss Robertson Monoplane**

"ST. LOUIS ROBIN"

establish a new World's Endurance Record for sustained flight, remaining constantly in the air for

420 Hours and 21½ minutes (over 2 weeks)

powered with Curtiss Challenger Motor and lubricated with

GULFPRIDE OIL 120

This is a wonderful accomplishment for the intrepid pilots; proves the excellent reliability of both plane and motor and the perfect lubrication secured with GULFPRIDE OIL.

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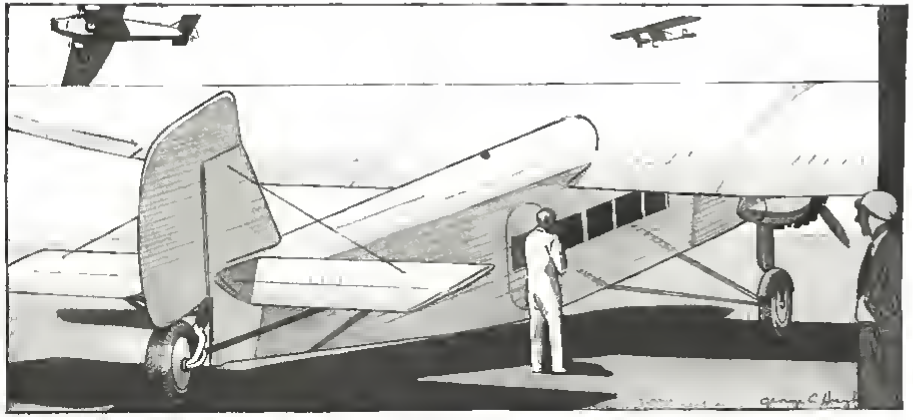

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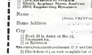

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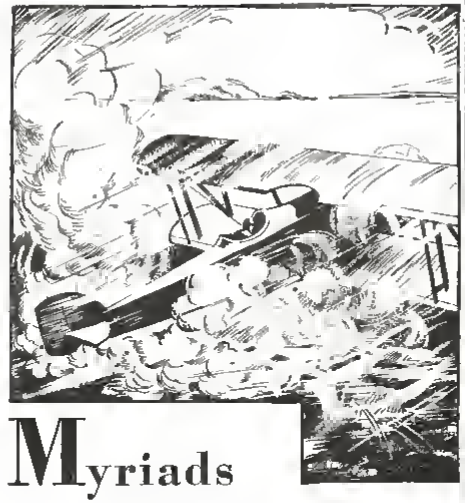

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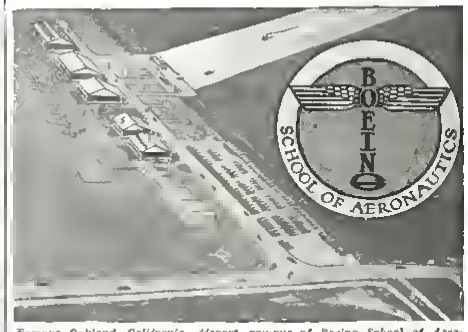

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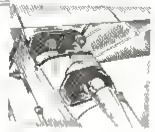

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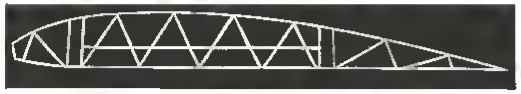

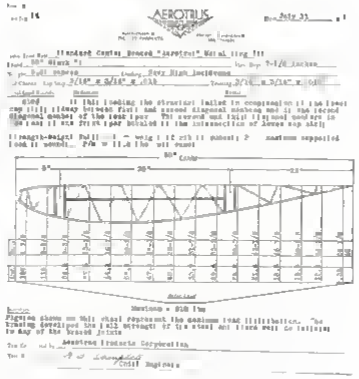

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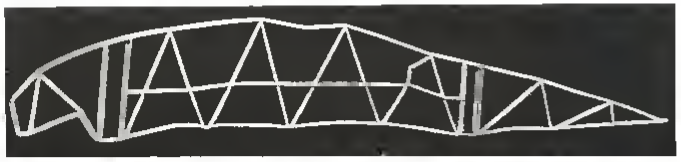

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